Ranunculaceae
(Crowfoot Family)
of
New York State

RICHARD S. MITCHELL
New York State Museum

J. KENNETH DEAN
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Contributions to a Flora of New York State IV
Richard S. Mitchell, Editor

1982

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The University of the State of New York
THE STATE EDUCATION DEPARTMENT
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PREFACE

OUR GOAL in producing this series is to present a useful and authoritative account of the plants of New York State. These contributions are intended to reflect the knowledge and taxonomic opinions of specialists who prepare the manuscripts, while following a generalized format for consistency. Inclusion of ecological, distributional, medical and economic information on each species is also one of our major aims. Habitat references, flowering times, pertinent synonymy, etc., apply specifically to New York plants rather than to the entire ranges. Complete illustration should facilitate identification of specimens for those who are not formally trained in botany. Descriptions are original, ordered and as complete as possible to provide sequential cross-referencing.

Distribution maps accompany species of seed plants, ferns, mosses, lichens and some groups of fungi. These are plotted by counties to eliminate pinpointing endangered habitats, while offering an accurate visual picture of past collecting. Maps are based on the master file at the New York State Museum, Albany, and supplemented by available data (specimens examined by the authors) from herbaria housing significant New York collections. Specific data or literature citations for any map may be obtained, on approval, from the Museum.

We hope that these bulletins will serve individuals with interest in the flora, as well as to provide information for state and federal agencies, conservation organizations, industry and the scientific community. With these works go our hopes for the preservation and wise use of a precious and lifegiving resource—our state's plantlife.

Richard S. Mitchell, Editor

The New York State Flora Committee

The steering council of the New York State Flora Committee met for the first time on January 19, 1976, and established as its goals the promotion of study of the state's plant resources and the publication of this series of Museum Bulletins. These contributions will be continually updated after publication for possible incorporation into larger volumes at a later date.

Members of the council at the time of this publication are:

Richard S. Mitchell, Chairman, State Botanist, N.Y. State Museum, Albany (Vascular Plants)
Charles J. Sheviak, Curator of Botany, N.Y. State Museum, Albany (Vascular Plants)
Edwin H. Ketchledge, College of Environmental Science and Forestry, Syracuse (Bryophytes)
Clark T. Rogerson, New York Botanical Garden, New York (Fungi)
George J. Schumacher, Biology Department, SUNY, Binghamton (Algae)

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ACKNOWLEDGMENTS

The illustrations in this treatment are originals by Carol Kuhn Teale. The appendices on insects and fungi are the work of J. Kenneth Dean, with reviews by Timothy McCabe, Clark Rogerson and John Haines, to whom we offer our thanks. Special thanks to Arthur Cronquist for comments on the treatment. Thanks also to members of the Steering Council of the Flora Committee for review. We wish to express our sincere appreciation to the staffs and curators of the following institutions for their complete cooperation and hospitality when we visited their collections: U. S. National Herbarium (US), New York Botanical Gardens (NY), Cornell University (CU, BH), Environmental Science and Forestry, Syracuse (SYRF), Harvard University (GH, NEBC), Brooklyn Botanical Gardens (BKL) and the Buffalo Museum of Science (BUF). Data from the above collections were added to the master file at the New York State Museum (NYS). This file was started by Homer House over 60 years ago, and was largely produced and maintained by Stanley Smith.

The classification system employed in this flora is that of Arthur Cronquist (1968), with modifications agreed upon through personal communication.

IMPORTANT NOTE

All economic uses, folklore, medical and pharmaceutical notes, uses as foodstuffs, etc., are compiled from the literature and do not represent an endorsement by the authors or the New York State Museum. Some of the uses may, indeed, be dangerous if incorrectly employed. Some are not effective and are presented for historical interest only.

LEGEND

FOR ALL MAPS IN THIS PUBLICATION THE FOLLOWING SYMBOLS APPLY:

Solid dot—specimen seen by author; data on file at the State Herbarium (NYS)

Circle—Field observation with location data and observers name on file (NYS)

Hollow triangle—Literature citation on file (NYS)

FOR ALL ILLUSTRATIONS IN THIS PUBLICATION THE FOLLOWING LETTER-DESIGNATIONS APPLY:

A. Habit sketch
B. Fruit
C. Fruit cluster
D. Rhizome (caudex)
E. Inflorescence
F. Flower
G. Seed
H. Leaf variant
J. Staminode
K. Receptacle
N. Nodal area
P. Petal

Ranunculaceae (Crowfoot Family)

The Ranunculaceae: a cosmopolitan family of annual and perennial herbs and vines (rarely subshrubs), particularly prominent in moist, cool-temperate floras. About 25 genera are found in North America, of which New York State has 16 native. Four genera, *Adonis*, *Nigella*, *Helleborus* and *Consolida*, are introduced, and also escape cultivation. Many species of this family are poisonous; some are extracted for narcotics or are otherwise important in internal medicine. The major way in which they are known, however, is in the horticultural trade. Some of the more important genera providing garden ornamentals are *Anemone* (Windflower), *Aquilegia* (Columbine), *Consolida* (Garden Delphinium), *Nigella* (Love-in-a-mist), *Adonis* (Pheasant's-eye), *Ranunculus* (Buttercup), *Helleborus* (Hellebore), *Aconitum* (Monk's-hood) and *Trollius* (Globeflower). Though members of the Ranunculaceae are primarily herbaceous, they find their closest relatives among the primitive woody plant families such as Berberidaceae and Magnoliaceae. Authors frequently find difficulty in reaching agreement on the limits and number of genera within Ranunculaceae. This is due in part to confusion of serial homology. A given part of a flower may be called staminode, honey-leaf or petal by different authors. What we have chosen to call perianth (a term used for the sterile envelope throughout this series) may be composed of sepals, petals, staminodes or elaborate flower-like nectaries in various combinations. These often serve to attract insects in a family whose pollination mechanisms are quite diverse. While many flowers are simple bee and fly pollinated types (eg. *Ranunculus*), there are trends within the family toward wind pollination (dioecism and polygamy) as well as adaptations to specialized pollinators. *Aquilegia canadensis* L. has an obvious adaptation to hummingbird pollination, while *Aconitum*, *Consolida*, *Delphinium* and *Nigella* have evolved hoods, spurs or specialized symmetry in conjunction with certain insect pollinators. Members of Ranunculaceae are found in an enormously varied range of habitats from alpine peaks to forest and swampland — from full, tropical sunlight to deep shade — but rarely in consistently dry habitats. Many species are water-loving, and a few are true, submerged aquatics.

FAMILY DESCRIPTION

Perennial or annual herbs or vines (rarely shrubby). Leaves are simple or compound, mostly alternate and estipulate, lobed, entire, cut or much-divided. Petioles may have sheathing bases. Flowers are typically bisexual (or plants may be polygamous to dioecious, as in *Thalictrum).* The perianth may be showy or inconspicuous and early-deciduous. It consists of two to many sepals which are often petaloid and showy, and may have up to two additional series of parts, variously called petals, honey-leaves or staminodia. Nectaries and nectary scales may also be present. Perianth parts are usually free, but they show some degree of adnation or cohesion in certain genera. Sepals are fused into a cup in some *Clematis* species. Flowers may have radial or bilateral symmetry, and the perianths of some genera are hooded or spurred. Stamens are usually many and spiraled (less commonly five or fewer). Ovaries are unicarpellate ranging from a few (rarely one) to hundreds, usually not cohering, often spiraling on the receptacle. The receptacle may be inconspicuous or may elongate to many times its original height in fruit. Fruits vary from several-seeded follicles to achenes or berries borne sessile or stipitate. In some genera they are plumose and wind dispersed. Seeds have a minute embryo and copious liquid to solid endosperm.

KEY TO GENERA

1. Plants not vining or woody at the base ..... (3)
1. Plants vining or woody toward the base ..... (2)
   2. Perianth of a single whorl of 4 (-6) parts; vines or suffrutescent herbs; roots not yellow ..... *Clematis* (p.)
   2. Perianth of a whorl of 5 petaloid parts and an inner whorl of 5 staminodes; subshrubs with yellow roots ..... *Xanthorhiza* (p.)
3. Plants aquatic, the submerged leaves branched-filamentous ..... *Ranunculus* (p.)
3. Plants without submerged, branched-filamentous leaves ..... (4)

4. Flowers with more or less showy perianth parts ..... (9)
4. Perianth parts inconspicuous and early-deciduous or lacking; flowers mostly of stamens and/or ovaries ..... (5)
5. Receptacle enlarging in fruit to make the head of achenes convex to spheroid or even cylindric ..... *Ranunculus* (p.)
5. Receptacle not enlarging beneath the achenes (or fruit berries or follicles) ..... (6)
6. Leaves simple, broadly palmately lobed and toothed; each plant with a solitary flower; roots yellow ..... *Hydrastis* (p.)
6. Leaves compound; flowers in racemes or panicles; roots not conspicuously yellow ..... (7)
7. Inflorescence a much-branched, diffuse panicle; plants often polygamous or dioecious .... *Thalictrum* (p.)
7. Inflorescence a simple or (1–3) branched raceme; plants with consistently bisexual flowers ..... (8)
8. Racemes simple, unbranched, mostly 3–15 cm tall; berries and their pedicels showy red, pink or white ..... *Actaea* (p.)
8. Racemes branched, mostly 15–60 cm tall; fruit of brownish follicles on short, brown pedicels ..... *Cimicifuga* (p.)
9. Perianth without spurs ..... (11)
9. Perianth with one or more arched, nectary-bearing spurs ..... (10)
10. Spur 1,; flowers bilaterally symmetrical ..... *Consolida* (p.)
10. Spurs 5; flowers radially symmetrical ..... *Aquilegia* (p.)
11. Flowers bilaterally symmetrical, purple; the upper lobe forming a helmet-shaped hood. .... *Aconitum* (p.)
11. Flowers radially symmetrical, variously colored, unhooded ..... (12)
12. Perianth 4-parted, urn-shaped, leathery ..... *Clematis* (p.)
12. Perianth usually 5 or more parted, not urn-shaped or leathery ..... (13)
13. Major leaves compound or lacerate, often to near their bases ..... (16)
13. Major leaves simple or lobed, not deeply cut or compound (or lacking at flowering time) ..... (14)
14. Flowers white, pink or blue-purple; follicle cluster subtended by a 3-parted involucre on a hairy, leafless stalk ..... *Hepatica* (p.)
14. Flowers pale to dark yellow; fruit of achene or follicle clusters on pedicels from leafy stems ..... (15)
15. Perianth of a single whorl of showy parts; fruit follicles ..... *Caltha* (p.)
15. Perianth of calyx and corolla; fruit achenes ..... *Ranunculus* (p.)
16. Flowers white, pale creamy to blue or rose-tinged ..... (20)
16. Flowers yellow, yellow-green or orange-red ..... (17)
17. Stem leaves profusely linear-dissected ..... *Adonis* (p.)
17. Stem leaves not linear-dissected ..... (18)
18. Perianth of two whorls; petals yellowish, calyx greenish; staminodes absent; fruit achenes ..... *Ranunculus* (p.)
18. Perianth a single whorl of petaloid parts; staminodes present; fruit follicles ..... (19)
19. Flowers mostly 4–6 cm broad; staminodes conic with undulate, petal-like margins ..... *Helleborus* (p.)
19. Flowers mostly 2–2.5 cm broad; staminodes obovate-clavate, with blunt, thickened tips, becoming strap-like with age ..... *Trollius* (p.)
20. Leaves and bracts linear-dissected, much-branched; fruit cluster globose, 3–4 cm in diameter ..... *Nigella* (p.)
20. Leaves and bracts not linear-dissected; fruit clusters less than 2 cm wide, usually much smaller. ... (21)
21. Flowers solitary on leafless scapes; leaves trifoliate; roots slender, fibrous, golden ..... *Coptis* (p.)
21. Flowers borne on leafy stems; leaves ternately compound or deeply lobed; stems arising from a rhizome, caudex or tuberous rootstock which is not conspicuously yellow ..... (22)
22. Leaves of 3 to many palmately incised segments; stigma small but capitate ..... *Anemone* (p.)
22. Leaves twice ternately compound (or more) with rounded leaflets; stigmas not capitate ..... (23)
23. Flowers borne in a terminal umbel; fruit of strongly-ribbed, sessile achenes (4–15 in number) ..... *Anemonella* (p.)
23. Flowers borne singly, terminal and axillary; fruit of weakly-ribbed, short-stipitate, divaricate follicles (usually 4) ..... *Isopyrum* (p.)

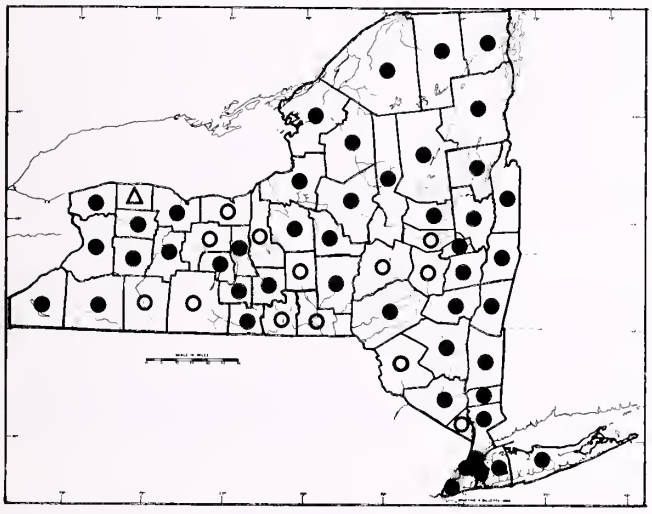
1. CALTHA

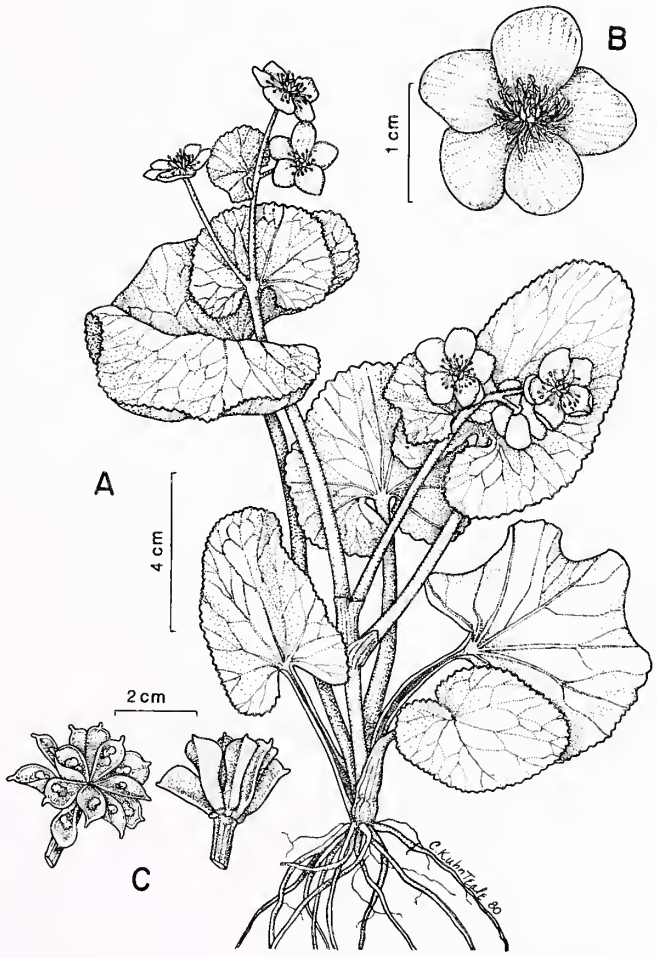
Common Names: Marsh Marigold, Cowslip, Elkslip, May-blob

Authority: Linnaeus, Species Pl., p. 558, 1753

A genus of about 15 species in temperate and arctic climates circumboreally. The common species of the boreal northern hemisphere, *Caltha palustris*, grows in wet places, but is not a true aquatic like the rarer (but also circumboreal) *C. natans* which has floating leaves. Elkslip, *C. leptosepala*, is the most widespread montane species of western North America. The plants are poisonous when raw, but are often boiled as pot herbs.

Description: Plants with **bisexual** flowers; **stigma** and **style** 1 per ovary, minute, but enlarging in fruit; **ovaries** free, (4) 5—30 or more, with many **ovules** and marginal placentation, becoming sub-terete to compressed, many-seeded **follicles** in a cluster; **seeds** with copious **endosperm; embryo** small; **stamens** numerous; **staminodes absent; perianth** parts free, 5—9 (10), in a single spiral series, yellow, orange, white, pink or bluish; **flowers** several to many per plant, borne singly on stout **peduncles** from the leaf axils from the base or near the tips of the plant; **basal leaves** often larger than the cauline ones with reduced petioles upward; **leaves** cordate, reniform, oval or elliptic, toothed or entire; **petioles** very short to many times the length of leaves; **stipules** partially sheathing the stem; **stem** a basal caudex or elongate to sprawling (floating); **roots** spongy, pale, fleshy.





1. *Caltha palustris* L.

Common Names: Marsh Marigold, Cowslip, King-cup, May-blob, "Cowlily"

Type Description: Linnaeus, Species Pl., p. 558, 1753

Synonyms: *Caltha flabellifolia* Pursh, *C. radicans* Forst., *C. parnassifolia* Raf., *C. integerrima* Pursh, *C. palustris* var. *radicans* (Forst.) Hartm., *C. palustris* var. *integerrima* (Pursh) T.&G., *C. palustris* var. *flabellifolia* (Pursh) T.&G.

Origin: Arctotertiary Forest (wetlands)

Habitats: Boreal and arctic marshes, swamps, wet meadows, ditches, swales and bog margins

Habit: Erect to decumbent, perennial herbs

Flowering: April—June

Fruiting: May—August

General Distribution: Labrador to Alaska and Eurasia, south to Nebraska and South Carolina

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, diffuse; **style** 1 per ovary, short, enlarging in fruit; **ovaries** (4) 5—12 (14), compressed-fusiform, 2—4 mm long, 1 mm wide, with numerous **ovules** and marginal **placentation,** becoming many-seeded, keeled follicles in **fruit; follicles** (4) 5—12, in a cluster, each 1.0—1.8 cm long, veiny, divergent, with a persistent **stylar beak,** dehiscing along an adaxial suture, follicles forming a green and tan, rosette-like crown of spent fruit after dehiscence; **seeds** elliptic, 2.0—2.5 mm long capped with floatation tissue, copious **endosperm** surrounding a small **embryo; nectaries** present between the ovary bases and inner filaments; **stamens** numerous, 5—7 mm long, spiraling; **filaments** slender, somewhat flattened; **anthers** 2-celled, basifixed, dehiscing by longitudinal slits; **perianth** of a single spiraling series of unfused parts; **perianth lobes** (**sepals**) 5—9, broadly oval to narrowly oblong, rounded to obtuse, pale to bright yellow or yellow-orange, 1—2 cm long, 0.8—1.5 cm wide, with many strong, dichotomous veins; **flowers** 1.4—3.1 (3.6) cm broad, borne singly, often in pairs from the axils of upper leaves; **bracts absent; peduncles** ridged and fluted, glabrous, 2—8 (10) cm long; **cauline leaves** alternate, progressively smaller and shorter petioled, the uppermost almost sessile, triangular-cordate to ovate, dentate, serrate or almost entire; **basal leaves** with cordate to truncate bases, reniform to oval, 6—15 cm long and wide, serrate, dentate, crenulate or almost entire, often shiny, leathery with **petioles** 6—18 cm long; all leaves with **hydathodes; petioles** ribbed 0.1—18.0 cm long, glabrous, their bases partially sheathing the stem, the larger ones lanceolate-auriculate; **stems** hollow, somewhat spongy, furrowed and grooved, glabrous, erect or decumbent, up to 80 cm tall, from a thick, perennial base covered with a mass of pale, spongy **roots.** (2n = 32 in North America, many ploidy levels in Europe).

Infraspecific Variation: It is not clear whether variations in habit and leaf shape reflect racial differences or are phenotypically induced by shading, water flow, temperature etc. Typical var. *palustris* has a stout, erect stem and broad basal leaves whose well-developed lobes may close or overlap the sinus; in contrast, so-called "var. *flabellifolia*" has a decumbent habit, often sprawling in cold streams, and the leaves are wedge-shaped with broad sinuses (truncated in the extremes). Intermediates appear numerous, but further study is needed. Leaf margins also show a wide range of crenulation, serration and dentation; in some populations most upper leaves are deeply and sharply toothed, giving a totally different aspect to the plants.

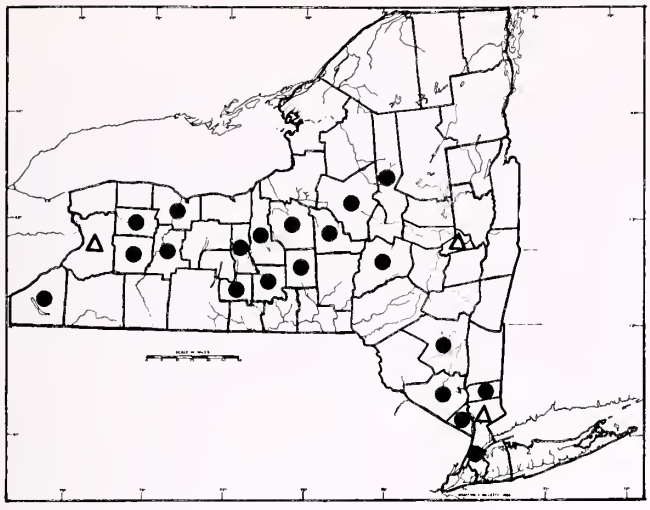
Importance: The fresh herb is distasteful and poisonous, containing the irritant oil Protoanemonin and the deadly glucoside Hellebrin, but these break down with boiling. Young plants have been commonly boiled as pot herbs in New York and New England. Care must be taken to avoid the stipules and mucilagenous stem bases, and the water must be changed at least once to rid the dish of an acrid taste and the extracted poisons. Another danger is the presence of other poisonous plants in the habitats where they grow, but they look like little else. Marsh Marigold is much feared and avoided in Europe, where it is perhaps more toxic. Juice of the petals, boiled with alum, has been used to produce a yellow dye.

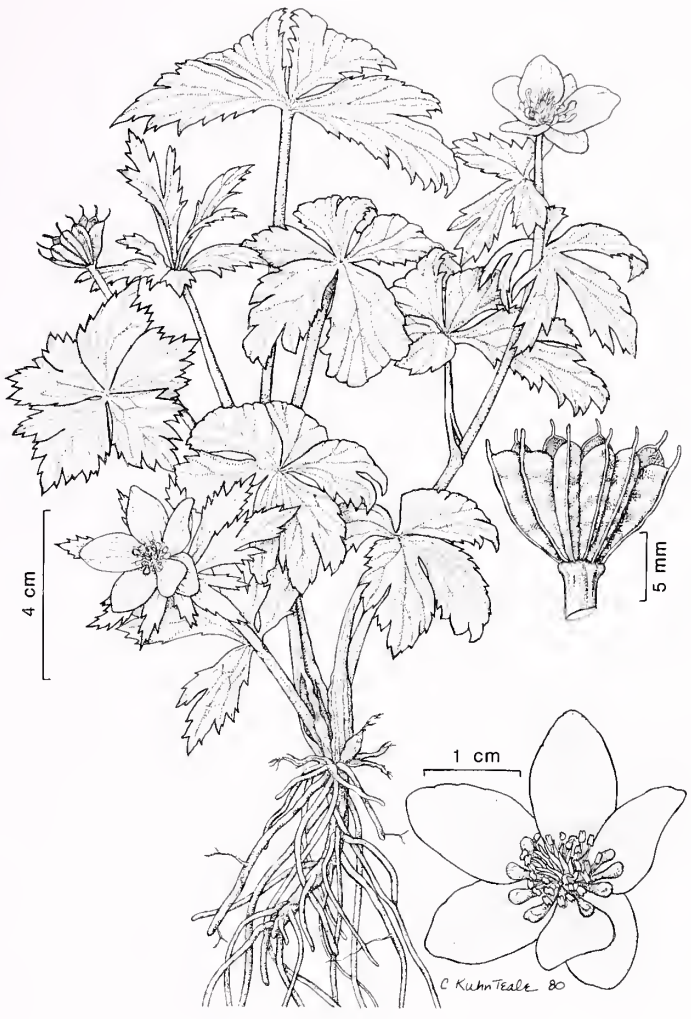
2. TROLLIUS

Common Name: Globeflower

Authority: Linnaeus, Species Pl., p. 556, 1753

A genus with about 15 species in Eurasia and one in boreal North America. *Trollius riederianus* reaches the Aleutian Islands, and *T. europaeus* escapes cultivation in Canada. *Trollius laxus,* the only truly North American species, has yellow flowers in the east and a white-flowered variety in the west. These are cultivated in wet places, as are about 10 Eurasian species. *Trollius laxus* is rare and threatened throughout the range of its eastern variety, being best represented in numbers in New York State.





1. ***Trollius laxus*** **Salisb.**

Common Names: Spreading Globeflower, Globeflower

Type Description: Salisbury, Trans. Linn. Soc., vol. 8, p. 303, 1803

Synonyms: *Trollius americanus* Muhl. (*nomen nudum* cited by DC.), *Gaissenia verna* Raf.

Origin: North America

Habitats: Open swales on marly hummocks, wet woodlands, swamps, borders, clearings; calcareous, saturated soils

Habit: Erect or spreading perennial herbs

Flowering: April—May (early June, rarely September)

Fruiting: May—July

General Distribution: Connecticut, New York, Pennsylvania, Ohio, Michigan (var. *albiflorus* in the Rockies westward)

Rarity Status: Threatened in the eastern United States; protected in New York State

Description: Plants with **bisexual** flowers; **stigmas** minute, 1 per ovary; **style** 1, per ovary slender, ca 3 mm long; **ovaries** 5—12, fusiform, slightly enlarged dorsally, 3—4 mm long, with numerous **ovules** in each, the **ovaries** becoming many-seeded **follicles** in fruit; follicles brown, borne in a cluster of 5—12, thin-walled, veiny, 0.8—1.2 cm long, swollen on their dorsal surfaces and with persistent styles; **stamens** 20—35, upcurved, becoming straight and spreading to alternate with the staminodia at dehiscence, outer stamens longer than inner ones; **filaments** slender, 3—6 mm long; **anthers** linear, borne laterally, ca 1.5 mm long; **staminodia** 8—18 (25), golden-yellow, waxy, clawed and upcurving, oblong-hexagonal to strongly spatulate, often obscurely 2—lobed, 3—5 mm long, starchy in texture, nectariferous at bases; **perianth** of a single series of 4–6 petal-like lobes, showy, 1.4—3.5 (4) cm broad, ultimately spreading, the **lobes** (**sepals**) oval-elliptic, with rounded to obtuse tips, at first greenish, becoming bright to pale or creamy yellow, with greenish veins, 0.6–1.8 cm long, 0.8–1.5 cm wide; **flowers** borne singly at branch tips; **peduncles** stout, glabrous, ridged, a continuation of the stem (which is not ridged); **cauline leaves** palmate, of (3) 5 or more narrowly obovate lobes, toothed and irregularly incised, glabrous, 2—6 cm in diameter, those nearest the flowers bract-like, sub-sessile; **basal leaves** similar to cauline ones, but segments much broader, especially near the tips, 3—18 (25) cm in diameter, long-petioled, often equaling or overtopping the flowers; **petioles** slightly clasping, glabrous, 0.1—25.5 cm long, shorter upward on the stem; **stipules** mostly at plant base, clasping and somewhat sheathing the stems and lower petioles; **stems** glabrous, 10—25 (38) cm tall, the **branches** smooth or obscurely ribbed; **stem base** perennial with tough, somewhat fleshy **roots**. (2n = 32)

Infraspecific Variation: Perianth color varies from bright yellow to cream in the eastern United States (var. *laxus*) and from creamy yellow to white in the west (var. *albiflorus* A. Gray). Leaves are extremely variable in size, lobing and toothing. In habit the plants may vary from dense, round-topped clumps near the ground to erect, delicate, single plants. Flowering stalks may have up to three bract-like leaves. Staminodes may be plump, dark yellow and waxy to linear and almost petal-like.

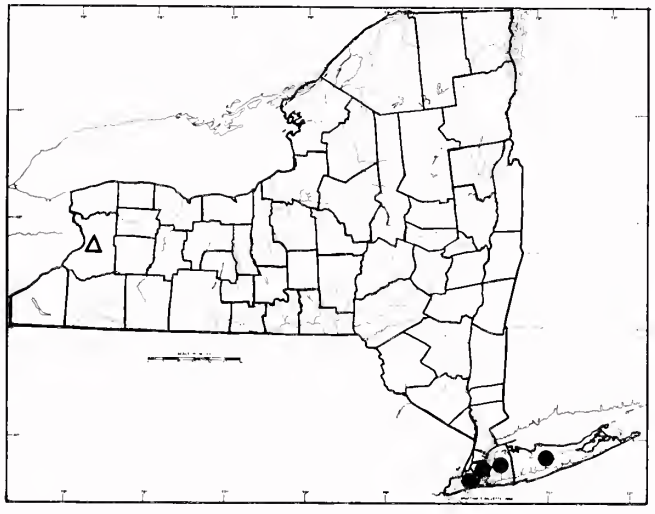
Importance: This rare, native plant is sometimes cultivated in moist places. It is vulnerable to exploitation and deserves protection. Though western-central New York appears to be the center of its distribution in the eastern United States, many sites formerly known are destroyed, especially in New York State's southeastern counties. *Trollius* is reported to contain poisonous alkaloids, as in *Ranunculus*.

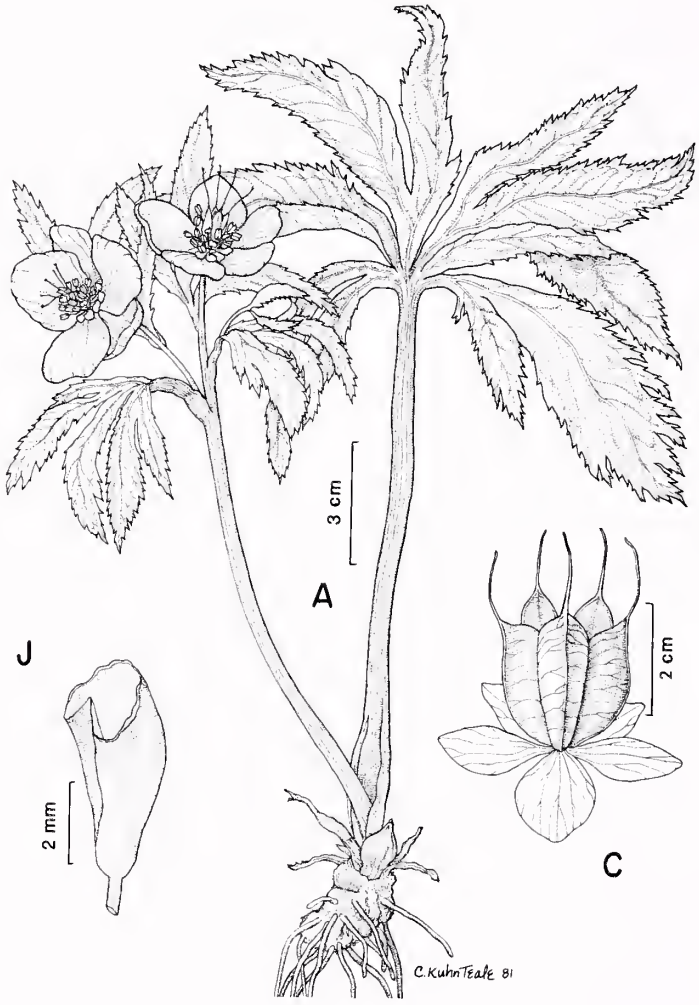
3. HELLEBORUS

Common Name: Hellebore

Authority: Linnaeus, Species Pl., p. 557, 1753

A genus of about 20 species of perennial herbs. They are native to calcareous regions of Eurasia, and many species are widely cultivated in cool climates. They are cold-resistant, blooming in fall, winter or early spring, even before *Scilla* and *Crocus*. These are some of the most poisonous of cultivated plants. Although several species are grown in New York State, only one has been reported as a persistent escape.





1. *Helleborus viridis* L.

Common Name: Green Hellebore

Type Description: Linnaeus, Species Pl., p. 558, 1753

Origin: Europe

Habitats: Waste places, shaded roadsides and calcareous woodlands as an escape

Habit: Erect, perennial herbs

Flowering: March—April (winter thaws)

Fruiting: April—June

General Distribution: An occasional escape in boreal North America; a native of Europe

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, capitate; **style** 1 per ovary, slender, 0.7—1.4 cm in length, curved, persistent in fruit; **ovaries** 3—5, slender, 5—9 mm long, bearing numerous **ovules**, becoming inflated, many-seeded **follicles** in fruit; follicles borne in clusters of 3—5, swollen, with transverse veins, 1.5—2.0 cm long (excluding the persistent style); **stamens** 30 or more, slender; **filaments** 5—10 mm long; **anthers** 1.5 mm long; **staminodes** ("petals") small, 5—9, upwardly curved, cornucopia-like, with in-rolled margins and undulate tips; **sepals** 5, in a single series, petal-like, free, yellowish-green, 2—3 cm long, 1—2 cm broad, oval-elliptic, with obtuse to acuminate tips; **flowers** (3.5) 4—6 cm in diameter, borne singly or more often in pairs or clusters of 3 (4) at the branch tips; **peduncles** stout, ribbed, glabrous to glandular-puberulent; **cauline leaves** petiolate or sub-sessile (those subtending peduncles), pedately lobed with oblanceolate, sharply serrated leaflets 2—10 cm long, 0.5—2.0 cm wide, unlobed, bifid or less commonly incised; **basal leaves** similar but long-petioled, larger (up to 40 cm wide), the **lobes** 8—21 cm long, 1.5—4.2 cm wide; **petioles** ridged, up to 30 cm long; **stipules** basal, clasping, obtuse to acute, 2.5—3.5 cm long, ca 1 cm wide; **stem** fluted and ridged, 15—30 cm tall, from a tough perennial **rhizome** and brittle **rootstock.** (2n = 32)

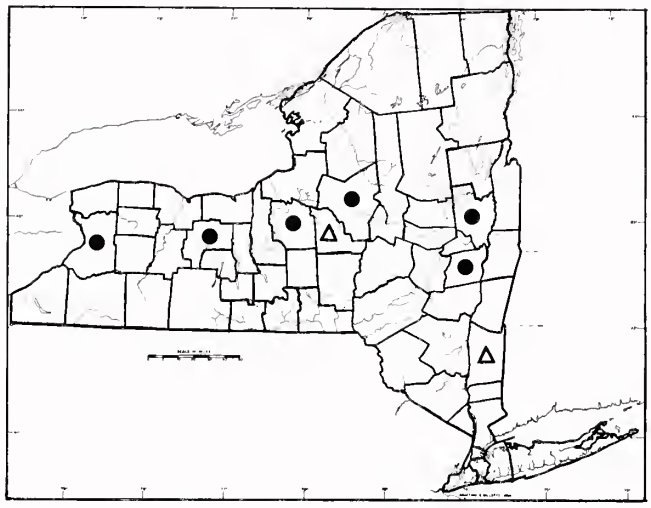
Importance: This species is not as common in cultivation as it once was, and has not been reported as an escape recently. Christmas-rose, *H. niger,* is more popular due to its showy, white to pinkish flowers; it was reported to escape once in 1880 at Sennet, N.Y., Cayuga County. Both living and dry plants of all Hellebores are extremely poisonous. Poisoning from contaminated hay is a major cause of cattle deaths in some areas. The plants contain cardiac glycosides, which act directly on the heart muscle, causing convulsion in addition to purging, delirium and eventual death. The main cardiac stimulant is Hellebrin.

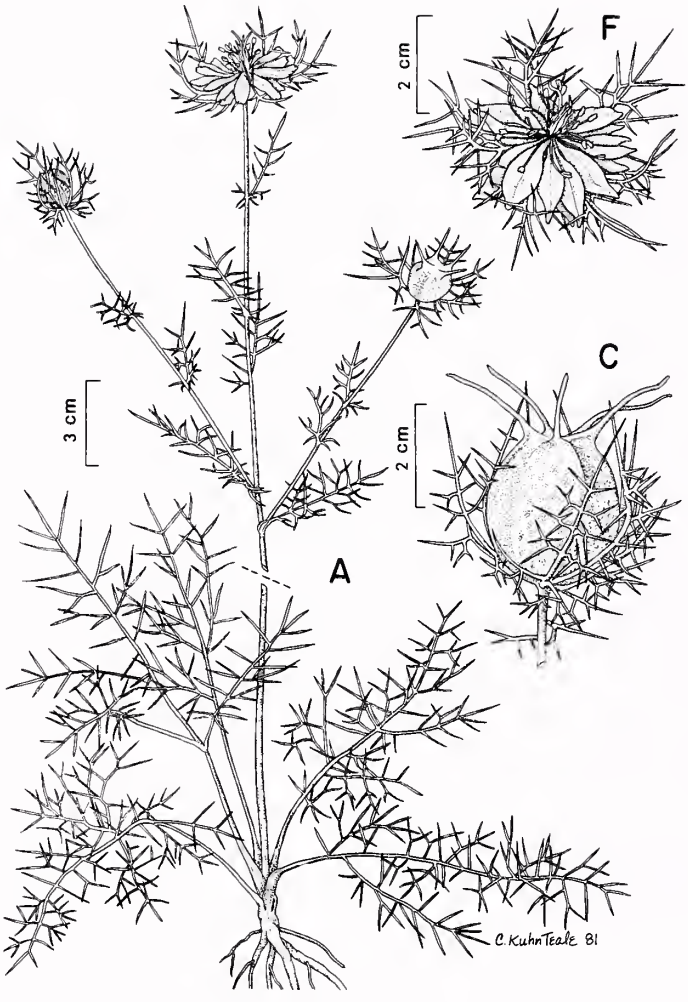
4. NIGELLA

Common Names: Fennel-flower, Love-in-a-mist

Authority: Linnaeus, Species Pl., p. 534, 1753

A genus of 15—20 species native to the Mediterranean region and western Asia. A number of species are cultivated and become self-seeding annuals within gardens, but *N. damascena* is the only one reported as an escape in New York State.





1. *Nigella damascena* L.

Common Names: Love-in-a-mist, Fennel-flower, Love-in-a-puzzle, Ragged Lady

Type Description: Linnaeus, Species Pl., p. 534, 1753

Origin: North Africa (also found in southern Europe)

Habitats: Waste places, roadsides, cultivated ground as an escape

Habit: Erect or spreading, annual herbs

Flowering: May—August

Fruiting: June—October

General Distribution: An uncommon garden escape in boreal North America, native to southern Europe and North Africa

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, in somewhat twisted area of the upper **style**; style 1 per ovary, slender, winged, 5—6 mm long, becoming 1.5—2.0 cm long and persistent in fruit; **ovaries** 5—7 (10), partially coherent, 5—6 mm long, slender, each with a number of **ovules**, becoming an inflated, many-seeded **follicle** in fruit; follicles fused into a red-brown, globe-like cluster 2.1—3.5 cm long (excluding styles), 1.8—3.1 cm wide, dehiscing apically; **seeds** ca 1 mm in diameter, dark brown, **stamens** numerous, slender; **filaments** 1—1.5 cm long; **anthers** 2 mm long; **petals** (also called **staminodes** or **honey-leaves**) flower-like, ca 7 mm long, stalked, tubular at the base with a lower lip and two flared upper ones, villous-bearded within and nectariferous, **or** tubular at base, expanded-lacerate at tips, **or absent; sepals** free, petal-like, white to bluish, lance-ovate to oval, obtuse, 0.6—1.7 cm long, about half as broad; **flowers** single at the branch tips, 2—4 cm broad; **involucre** dissected like the leaves, closely subtending the flower, 3.0—5.5 cm broad; **leaves** 2—12 cm long, alternate, pinnately to bipinnately, finely dissected into narrowly linear segments; **petioles** 0—8 cm long; **stipules absent; stem** ribbed, erect or spreading 15—30 cm from a slender, annual **taproot.** (2n = 12)

Infraspecific Variation: The differences in petal types found in our materials are striking. Breeding may be responsible for this variation, since all our 19th century materials have a complex petal type and more recently collected materials have a simple petal type or none at all. The most closely related species cultivated in our area is *N. arvensis,* in which there is no involucre. Flowers of both these species range from white to bluish.

Importance: *Nigella damascena* has been a favorite in old-fashioned yard plantings, as a border, or seeded in several times during a season to fill unused garden space. Like its relative *N. sativa*, its seeds are used as a pungent spice and called "fennel".

5. CIMICIFUGA

Common Names: Bugbane, Rattletop

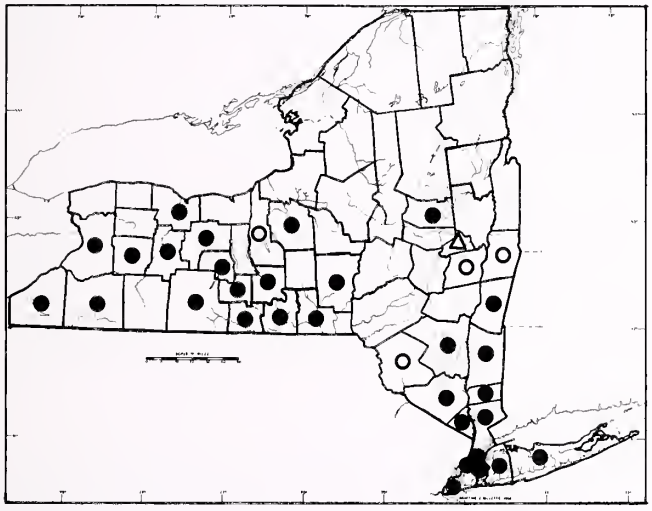
Authority: Linnaeus, Syst. Nat., ed. 12, p. 659, 1769

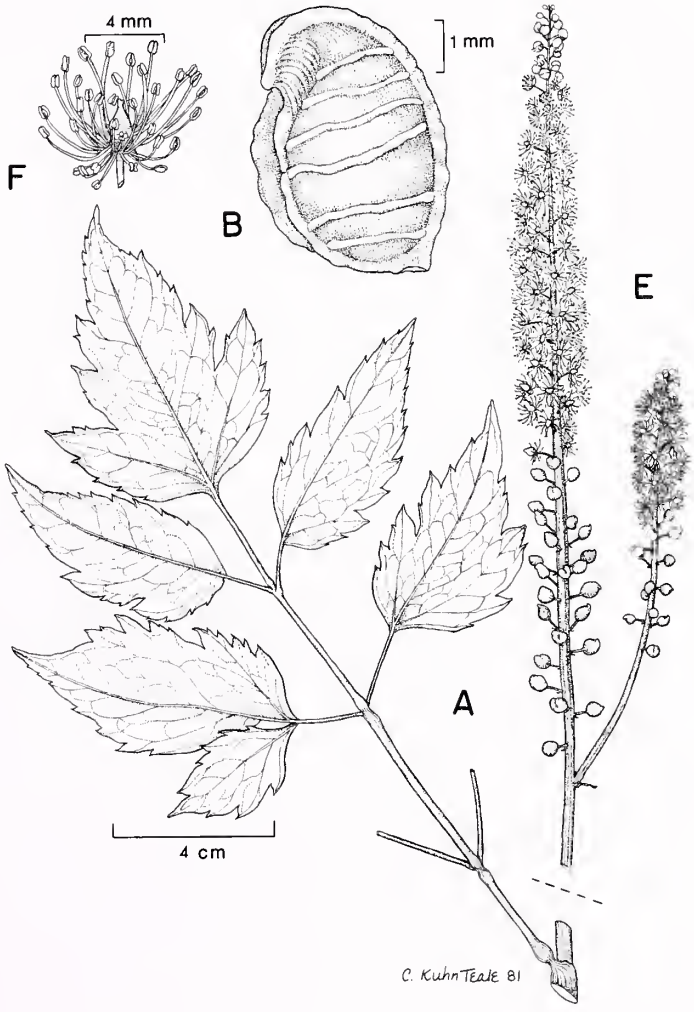
A genus of about 20 species, mostly in eastern Asia, with six in North America. *Cimicifuga racemosa* is native to New York State, and though *C. americana* has been reported, no specimens have been found. Members of the genus have a spotty history of use in folk medicine, and some have been used as natural insect repellent.

Description: Plants with **bisexual** flowers; **stigma** and **style** 1 per ovary, persistent; **ovaries** 1—8, stalked in some species, forming dry, dehiscent, several-seeded **follicles** in fruit; **stamens** numerous, with pale, slender **filaments** and small, yellow **anthers**; **staminodes** 1—9, bifid; **perianth** of 4 or 5 petaloid parts which are deciduous at anthesis; **pedicels** often upcurved in fruit; **inflorescences** are elongated, simple or branched racemes; leaves ternately to multiply compound or simple-pinnate; **leaflets** broad, toothed, serrated or often lacerate; **petioles** ribbed; **stems** up to several feet tall, from a tough, perennial **rhizome** system and fibrous **roots.**

KEY TO SPECIES

1. Ovaries 3, 5 or 8, basally stalked; stigma (in fruit) minute, on a pointed style; seeds with a chaffy covering ..... *Cimicifuga americana* (report only)
1. Ovaries single (very rarely 2—3), not stalked; stigma (in fruit) knob-like or blunt, on a stout style; seeds with rough sides, but not chaffy ..... 1. *Cimicifuga racemosa* (p.)





1. *Cimicifuga racemosa* (L.) Nutt.

Common Names: Black Snakeroot, Black Cohosh

Type Description: Linnaeus, Species Pl., p. 504, 1753

Synonyms: *Actaea racemosa* L., *Macrotrys actaeoides* Raf., *M. racemosa* (L.) Sweet, *Cimicifuga serpentaria* Pursh, *Thalictrodes racemosum* (L.) Kuntze

Origin: Circumboreal Arctotertiary Forest

Habitats: Moist to dry woodlands, thickets

Habit: Large, perennial herbs

Flowering: June—September

Fruiting: July—December

General Distribution: Southern New England to s. Ontario, south to Georgia and west to Missouri, primarily Appalachian (escaping cultivation elsewhere)

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, broad, textured, knob-like or merely blunt; **style** 1 per ovary, thick, often recurved, ca 1 mm long; **ovary** 1 (rarely 2—3), not stalked, oval, ca 3 mm long, with several **ovules,** becoming a smooth to prominently ribbed, brownish, tough-walled **follicle** 6—9 mm long, 3—6 mm wide, dehiscent at the apex and along the adaxial suture, yielding several rough-sided **seeds; stamens** 20—70, showy, slender; **filaments** creamy, 6—9 mm long; **anthers** golden, ca 0.5 mm long; **staminodia** 4—7, pale, linear, bifid at tips, 3—4 mm long; **perianth** of 4—5 unfused, cup-like lobes, ca 3 mm long, 2 mm wide, which are greenish becoming cream-colored, and are shed at anthesis; **peduncles** 3—6 mm long and densely villous, as is the **axis** of the inflorescence; **bracts** 2—3 mm long, sparsely villous, lanceolate, 1 subtending each pedicel and inflorescence branch; **inflorescence** a compound raceme up to 9 dm in height, with upwardly-arching, lateral branches 1—4 dm tall; **leaves** pinnately, biternately or triternately compound, 10—45 cm long; **leaflets** strongly serrate-apiculate or doubly serrate, irregularly cut and lobed, 2—14 cm long, 1—9 cm wide, puberulent along the veins, especially when young; **petioles** stout, 3—10 cm long, the central **rachis** of the leaf puberulent to sparsely villous; **petiolules** often villous, 0—3 cm long; **stem** ribbed, glabrous to sparsely villous below the inflorescence, up to 2.6 meters tall, from a tough, gnarled **rhizome** and fibrous **root system.** (2n = 16)

Infraspecific Variation: There is considerable variation in leaflet shape and laceration; this has prompted use of such names as var. *cordifolia* (Pursh) Gray and forma *dissecta* (Gray) Fern.

Importance: The plants are occasionally cultivated and are known to escape in New England north of their natural range. The dried roots and rhizome have been extracted for use in folk medicine, but many of the supposed uses are contrary to the actual effects of the decoction. It is listed as an alterative, sedative and emmenogogue. It depresses vasomotor activity and stimulates uterine contraction. Due to hypoglycemia-inducing properties of certain alkaloids, the plant has joined a long list of potential antidiabetics. Overdoses produce headache, tremors, convulsion and vertigo.

6. ACTAEA

Common Names: Baneberry, Necklaceweed, Cohosh

Authority: Linnaeus, Species Pl., p. 504, 1753

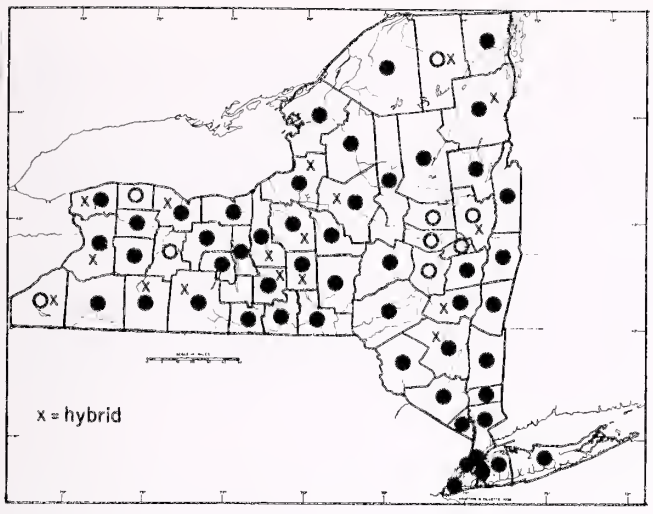
This is a genus of about 5 species in boreal Eurasia and North America. Two species and their hybrids are native to New York State. They are poisonous (especially the berries and roots).

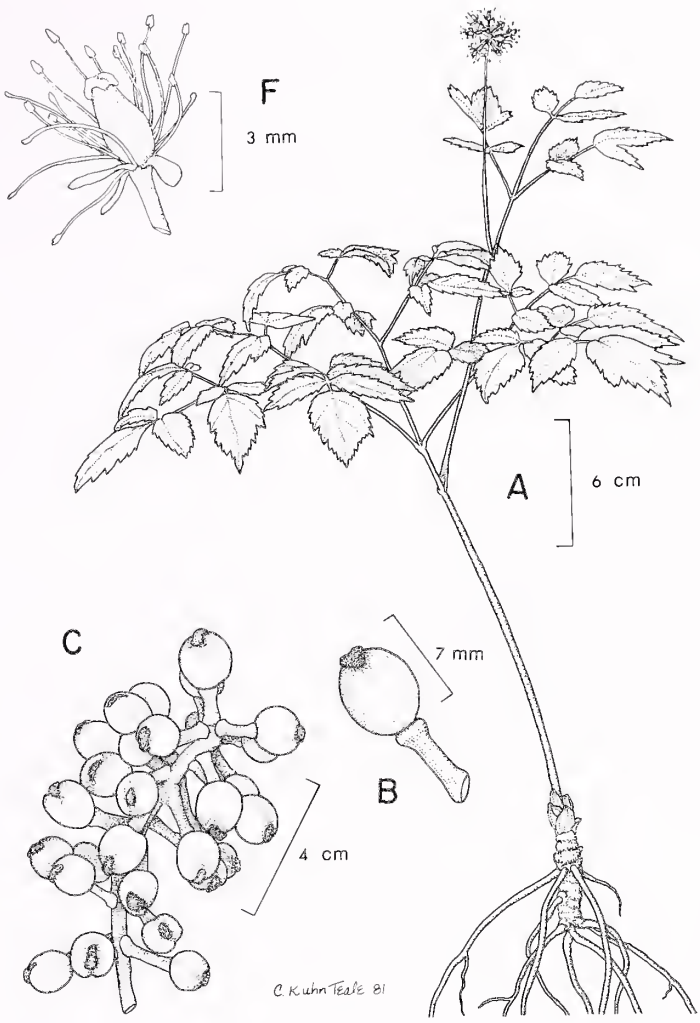
Description: Plants with **bisexual** flowers; **stigma** bilobed, sessile; **style absent; ovary** 1, with many **ovules,** becoming a fleshy, many-seeded **berry; stamens** numerous; **petals** small, narrowly spatulate; **sepals** 3—5, early deciduous; **pedicels** gradually shorter toward the inflorescence tip; **inflorescences** terminal and axillary racemes; **leaves** compound, pinnately and ternately; **leaflets** sharply toothed and often lobed; **stipules** sheath the lower stem; **stem** erect from a tough perennial **caudex** and **rootstock.**

KEY TO SPECIES*

1. Fruiting pedicels thick, 1—2.5 mm in diameter; fruit usually white; undersides of the leaflets glabrous, except for a few minute hairs on the veins ..... 1. *Actaea pachypoda* (p.)
1. Fruiting pedicels slender, 0.3—0.7 mm in diameter; fruit usually red; leaflets puberulent on the undersides ..... 2. *Actaea spicata* (p.)

*Note: Plants showing combinations of the characters used in this key are known. See the sections on Infraspecific Variation and Hybridization for discussion.





1. ***Actaea pachypoda*** **Ell.**

Common Names: White Baneberry, White Cohosh, Doll's-eyes

Type Description: Elliott, Sketch. Bot. S. C. & Ga., vol. 2, p. 15, 1827

Synonyms: *Actaea spicata* var. *alba* L., *A. alba* (L.) Mill., *sensu* American authors, *A. americana* Pursh var. *alba* Pursh, *A. brachypetala* DC. var. *alba* DC., *"A. brachypoda"* mistakenly ascribed to Elliott by Rydberg.

Origin: Ancient Arctotertiary Forest

Habitats: Moist to dry, rich woods thickets and borders

Habit: Large, erect, perennial herbs

Flowering: May—June

Fruiting: July—October

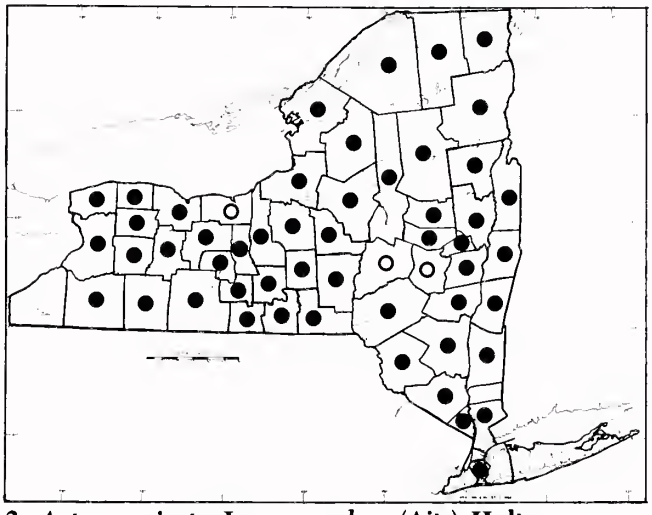
General Distribution: Nova Scotia to Manitoba, south to Louisiana, west to Oklahoma

Description: Plants with **bisexual** flowers: **stigma** 1, of 2 lip-like lobes, dark, rough in texture, 1—1.5 mm in diameter, as wide or wider than the young ovary, persistent, becoming enlarged and purple in fruit; **style absent**; **ovary** 1, keg-shaped, 2—3 mm long, 1 mm wide, with several **ovules**, becoming a several-seeded, globose **berry** in fruit; **seeds** brown, rough, wedge-shaped, ca 1.5 mm long; **berry** shiny, fleshy, white to ivory, often suffused with purple near the persistent stigma, 5—9 mm long, 4—7 mm wide; **stamens** 15—25; **filaments** broader near the tips, 4—5 mm long; **anthers** 0.5 mm long; **perianth** of 2 series or sepals absent; **petals** 4—10 grading from 3-veined, narrowly spatulate structures to single-veined, bifid-tipped, staminode-like lobes, cream-colored and 2—4 mm long; **sepals** (when present) dropping very early, whitish-green, ca 3 mm long and broad, enclosing the bud; **pedicels** thick, somewhat fleshy, minutely villous, 2—12 mm long in flower, elongating, up to 2.5 cm in fruit, becoming thicker 1—2 (4) mm thick, swollen at both ends, greenish-pink to red, often projecting at 80—90° angles from the infrutescence axis, each with 1—2 minute; sharp-pointed **bracts** at the base; **inflorescence** a dense raceme (in flower) 2—6 cm long, becoming more open as it grows, reaching lengths of (4) 7—17 cm in fruit; **axis** densely villous; **peduncle** less villous, a continuation of the stem, variable in length, depending on the proximity of leaves; **"bract"** sometimes present, consisting of a single leaflet between the inflorescence and leaves; **leaves** bipinnately to bi- or triternately compound, 1—5 (6) dm long; **leaflets** 3—many, irregularly toothed and lobed, with acute tips and attenuate to truncate or cordate bases, 1.5—15 cm long, 1—9 cm broad, glabrous or minutely pubescent along lower veins; **petioles** 2—20 cm long; **stipules** scarious, sheathing at the plant base; **stem** 4—12 (18) dm tall, from a tough, perennial **caudex** ca 1 cm in diameter, up to 10 cm long, with fleshy lateral **roots**. (2n = 16)

Infraspecific Variation and Hybridization: Red and pink-berried plants of *A. pachypoda* are known. Some of these have more pubescent leaves and are possible hybrids with *A. spicata* ssp. *rubra*. Such plants have been called *A. pachypoda* forma *rubra* (Killip) Fern.

Importance: All parts of the plants are poisonous, due to the presence of certain glycosides and essential oils. The ingestion of berries or roots is most common, resulting in stimulation possibly ending in circulatory failure, cramps, headache, dizziness and vomiting.

Note: The earliest description of white-berried plants reached Linnaeus from Cornut who stated that plants had white or red berries. Linnaeus chose to describe an American variety of European *A. spicata* with white berries only; he based his description on Cornut's illustration, which could only represent *A. spicata* or, at best, ssp. *rubra*, since the infructescence is dense, with filiform, ascending pedicels. Fur further discussion see Fernald (1940) and Gleason (1944).



2. *Actaea spicata* L. ssp. *rubra* (Ait.) Hult.

Common Names: Red Baneberry, Snakeberry, Black Cohosh

Type Description: Linnaeus, Species Pl., p. 504, 1753

Synonyms: *Actaea rubra* (Ait.) Willd., *A. spicata* var. *rubra* Ait., *A. arguta* Nutt., *A. neglecta* Gillm. ex Lloyd; *A. alba sensu* Rydb. not Mill. is the more western, white-berried form, *A. rubra* f. *neglecta* (Gillm.) Rob.

Origin: Ancient, Arctotertiary Forest

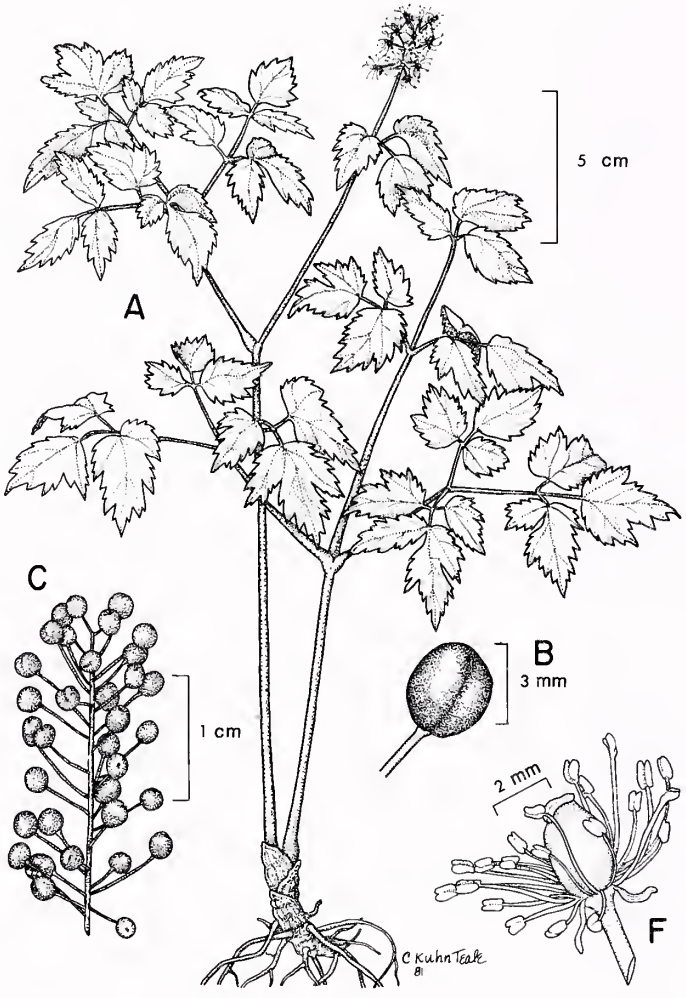
Habitats: Moist woods, thickets, streambanks, thickets

Habit: Large, erect or ascending, perennial herbs

Flowering: May—July

Fruiting: August—November

General Distribution: Southern Labrador to Alaska, south to Ohio, Indiana, Arizona, California



Description: Plants with **bisexual** flowers; **stigma** 1, of 2 lip-like lobes, dark rough in texture, 0.7—1.5 mm in diameter, usually narrower than the young ovary, persistent, but not enlarging or conspicuous in fruit; **style absent; ovary** 1, keg-shaped, 2—4 mm long, 1.5—2 mm wide, with several **ovules**, becoming a several-seeded, globose to ellipsoid **berry** in fruit; **berry** fleshy, bright to dull red (rarely white), 7—12 mm in diameter; **seeds** rough, brown, wedge-shaped, semicircular, ca 3 mm long; **stamens** 15—25; **filaments** slender, 3—9 mm long; **anthers** 0.5 mm long; **perianth** of 2 series; **petals** (4) 5—9 (10) or rarely lacking, 2—4 mm long, spatulate, 3 (1)

veined, green and creamy white; **sepals** 3 (-5) cupped, ca 2 mm long, creamy-white to greenish or purple tinged, early deciduous; **pedicels** slender, densely pilose, 3—10 mm long in flower, becoming reddish-scabrescent, 10—25 (30) mm long, 0.3—0.7 mm wide in fruit, slightly ascending or at right angles to the axis; **bracts** minute, pointed, 1 at the base of most pedicels; **inflorescence** a globose to elongate raceme, 2—5 cm long, growing to 5—7 cm long in fruit; **peduncle** densely villous, less so below, where it is merely an extension of the stem, quite variable in length depending on proximity of a leaf; **leaves** bipinnately to bi- or tri-ternately compound (0.5) 2—5 dm long; **leaflets** 3—many, irregularly toothed and lobed, with acute to acuminate tips and attenuate to truncate bases, 1—13 cm long, 0.5—8 cm broad, minutely puberulent to villous beneath; **petioles** 2—24 cm long; **stipules** sheathing at the plant base; **stem** 5—17 dm tall, often branched, arising from a tough, perennial **caudex**, ca 1 cm in diameter, 6—12 cm long, with fleshy, tough, lateral **roots.** (2n = 16)

Infraspecific Variation and Hybridization: This native subspecies is part of a circumpolar complex of taxa which vary mainly in fruit color and leaf dissection (Hultén, 1971). White-fruited plants of the species are known from New York State, and are relatively common in western states. When these show more prominent, purplish stigmas and little pubescence, they are suspected hybrids with *A. pachypoda*. Sterility of fruit in a number of specimens also lends credence to the theory that they are of hybrid origin. *Actaea pachypoda* forma *rubra* varies in pedicel thickness and fruit color (red to pink) providing the clinal link between the species. Rarely the leaves and inflorescence are borne on separate stalks.

Importance: As in White Baneberry, all parts of the plant are poisonous, especially the caudex, roots and berries. We know of at least one case where an inexperienced collector mistook the plants for Ginseng. Red Baneberry is not a commonly cultivated plant, but can be a nice addition to a garden, due to its handsome foliage and late summer berries.

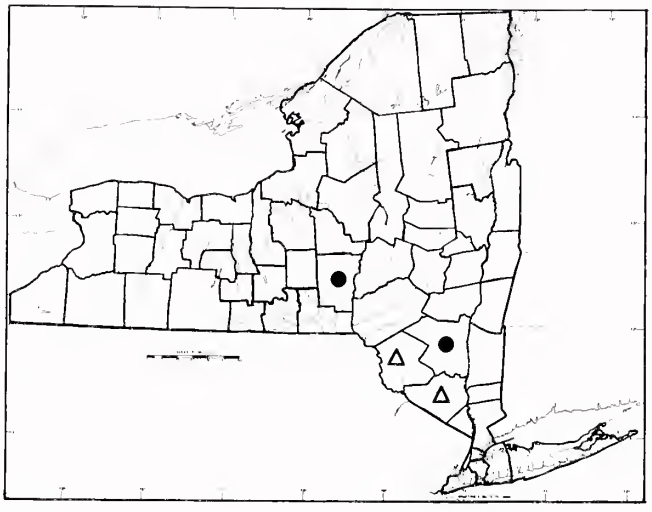
7. ACONITUM

Common Names: Monk's-hood, Aconite, Wolf's-bane

Aurthority: Linnaeus, Species Pl., p. 532, 1753

A large, boreal genus with 50–100 species in Eurasia and North America. Several species occur in Alaska, California and the Rocky Mountains, notably *A. columbianum* and *A. delphinifolium*. The three species native to the north-central and eastern U. S. are somewhat local to rare, and probably represent relicts of Arctotertiary associations. *Aconitum uncinatum* and *A. reclinatum* are southern Appalachian elements, while New York State's only species, *A. noveboracense*, is an extreme rarity, known only from a few sites in New York, Wisconsin, Iowa and Ohio. Plants of this genus are grown as ornamentals and are a source of drugs.

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, minute; **style** short, pointed; **ovaries** 3–5, free, becoming several-seeded **follicles**; **seeds** angled and winged, often with minute scales; **stamens** numerous, the **filaments** expanded near the bases; **petals** 2–5, the upper ones concealed in the "helmet" of the calyx; each **upper petal** bearing a coiled nectary or spur at its summit and a lateral, expanded lamina, clawed below; **lower petals** usually vestigial; **sepals** 5, petaloid, the upper one arched over the others, resembling a **helmet** or hood; **lateral sepals** long-oval to reniform; **pedicels** glabrous or pubescent; **inflorescences** of racemes, clusters or flowers borne singly at branch tips; **leaves** palmately lobed and variously cut and toothed, with long to short **petioles** (nearly sessile near the flowers); **stems** slender to thick and tough, often branched, erect or reclining, some species even twining on other plants; arising from root-stem transition **tubers** which are pale and fleshy, perennating by producing a budding new **tuber** (stalked or unstalked) from the disintegrating old one each year.



1. *Aconitum noveboracense* Gray ex. Cov.

Common Names: Northern Monk's-hood, New York Monk's-hood, Aconite

Type Description: Gray in Coville, Bull. Torrey Club 13, p. 190, 1886

Synonym: *Aconitum uncinatum* L. ssp. *noveboracense* (Gray) Hardin

Origin: Northwestern North America or pre-Pleistocene central Canada

Habitats: Streamside crevices, damp, cold, mossy talus, moist cliff bases and ravines in rich woods or partial clearings in seeps

Habit: Branched or simple, erect (or ascending) herbaceous perennials (usually erect but may be prostrated by stream flooding)

Flowering: Mid—July to October

Fruiting: August—November

General Distribution: A few scattered colonies in New York State, Wisconsin, Ohio and Iowa

Rarity Status: Protected under the federal Endangered Species Act of 1973; listed threatened in 1978; protected under New York State law

Description: Plants with **bisexual**, protandrous flowers; **stigma** 1 per ovary, minute; **style** 1 per ovary, short, pointed; **ovaries** 3–5, fusiform, each becoming a several-seeded **follicle**; follicles 3–5, narrowly cylindric, ca 2 cm long, 5 mm wide with persistent styles, tan to dark brown, veiny, dehiscing along the upper (adaxial) side; **seeds** 2–3 mm in diameter, strongly angled and veined, straw-colored to dark brown with chaffy scales on some surfaces and a longitudinal wing; **stamens** numerous, 5–7 mm long; **anther sacs** yellowish, 0.4–0.6 mm long; **filaments** slender, expanded at their bases; **petals** 2–5, the upper 2 well developed, pinkish-purple tinged, concealed by the upper sepal (hood); **upper petal segment** 6 by 3 mm, tubular, with a recurved, glandular tip and a flared lip below; lower portion narrowed to a caniculate **claw** ca 7 mm long; **lower** three **petals** (when present) vestigial, minute; **sepals** petaloid, intensely deep purple to lavender-blue, finely pubescent in patches, especially within; **lower** 2 **sepals** oblanceolate, ca 11–15 mm long, 3–6 mm wide; **lateral** 2 **sepals** orbicular, 12–13 mm long, 9–18 mm wide; the **hood,** a large upper sepal, galeate, hemispheric to slightly conically extended upward, ca 14–21 mm high, 9–15 mm deep, with a blunt to obtuse apex; **inflorescence** type dependent on age and vigor of the plant, varying from terminal panicles to racemes, to double or single flowers at the lower branch tips; 2–3 flushes of flowers may

occur in a season, leaving ripe fruit at the plant summit and flowers near the base by October; **pedicels** 1–3 cm long, densely white-pubescent; **peduncles** (when present) less pubescent than pedicels; **leaves** palmatifid, alternate, dark green, sometimes leathery, orbicular in outline, 2–9 cm broad, with or without a fine pubescence, **lobes** (3) 5–7, cuneate and ternate or deeply cut, with acuminate to acute teeth; **petioles** 0.1–8.5 cm long, reduced upward on the stem; **stipules absent; stems** terete, simple or branched, erect or ascending up to 1.5 m tall, from a short, whitish, tuberous **rootstock** with 1-several closely associated daughter tubers (2n =16)

Infraspecific Variation: Intensity of the typically deep purple flowers varies from year to year as do the whitish areas on the lateral sepals. In strong light flowers often show an irridescent rose glow suggesting possible ultra-violet transmition. Some individuals have dark purple to black stems, and these have been seen to be visited by hummingbirds, perhaps preferentially. Plants may develop minute, whitish, apically scaly bulblets in the leaf axils. Browsed plants often have less dissected leaves—commonly ternate. Helmets vary in shape.

Taxonomic Note: We are considering this to be a full species in this treatment; however, it is perhaps better considered a subspecies or variety of *A. columbianum* of the west. No such combination had been made at the time of this publication. Hardin (1964) reduced *A. noveboracense* to a subspecies of *A. uncinatum*, a logical choice within the context of the eastern United States. The tuber type in *A. noveboracense* is sub-sessile, however, and pubescence, erectness and helmet types appear to put its affinities with the *A. columbianum* complex.

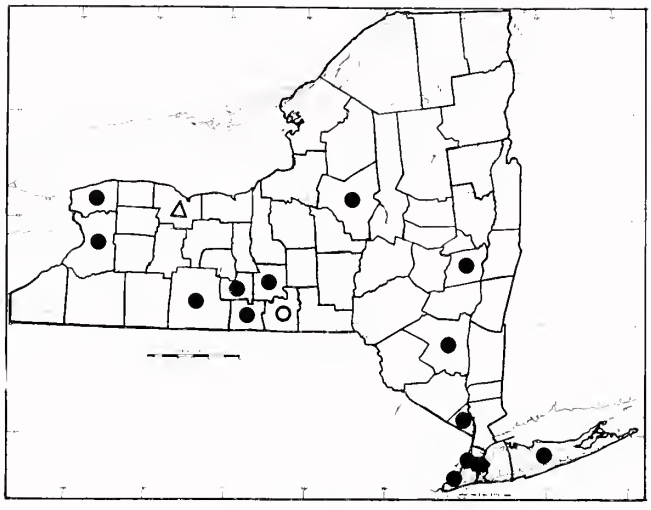
Importance: Closely related species are known to be very poisonous. *Aconitum* species contain toxic alkaloids, and are the source of the drug Aconite and the alkaloid Aconitine. Extracts are known to be highly sedative, to slow heart activity, and, in all but the most minute quantities, to paralyze the nervous and circulatory systems. Applied externally they are used (mostly in Europe) for complaints of neuralgia and rheumatism. They can kill, however, by entering the bloodstream through breaks in the skin. Pseudo-aconitine, found in some species, is one of the most deadly poisons known. Both humans and livestock may be killed by ingesting small amounts of plant materials. The planting of Aconites in gardens or near vegetables has led to deaths when the tubers were mistaken for horseradish. *Aconitum noveboracense* is frequently browsed by deer with unknown effects.

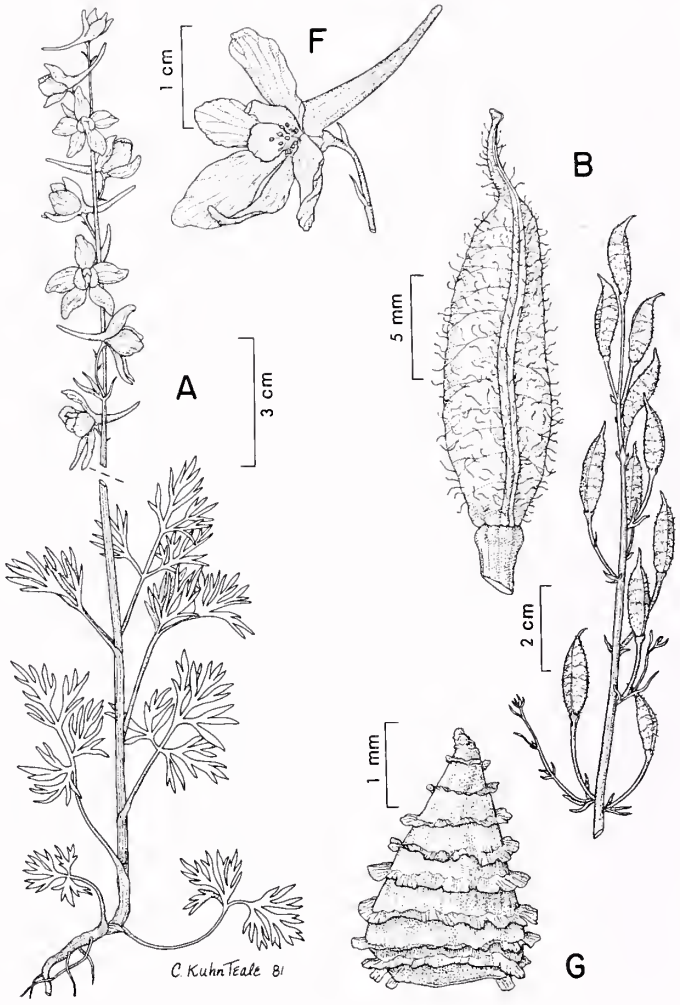
8. CONSOLIDA

Commong Names: Larkspur, Delphinium

Authority: (DC.) S. F. Gray, Nat. Arr. Brit. Pl., vol. 2, p. 711, 1821

A genus of about 50 species of annual herbs, native to Eurasia (excluding the true Delphiniums). They are sometimes included in the genus *Delphinium*, but are quite distinctive in having a single petal and follicle. A number of native *Delphinium* species occur to the west and south of New York State, but none have been reliably reported to occur here. Our two species of *Consolida* are garden escapes. *Consolida regalis* S. F. Gray is not treated here because of the rarity of its escape and its lack of persistence.





1. ***Consolida ambigua*** **(L.) Ball & Heyw.**

Common Name: Rocket Larkspur

Type Description: Linnaeus, Species Pl., ed. II, p. 749, 1763

Synonyms: *Consolida ajacis* of authors, not (L.) Shur, *Delphinium ajacis* of authors, not L., *Delphinium ambiguum* L., *Delphinium consolida* in Torrey Flora, not L.

Origin: Mediterrainian region

Habitats: Roadsides, grassy fields and disturbed ground as an escape

Habit: Erect, branching annuals

Flowering: May—August

Fruiting: June—October

General Distribution: Escaping from gardens in boreal North America and Asia (as well as in Europe where it is also native)

Description: Plants with **bisexual** flowers; **stigma** 1, capitate, **style** 1, slender, persistent; **ovary** 1, fusiform, densely villous, ca 4 mm long with several ovules, becoming a several-seeded **follicle**; follicle 1, 10–27 mm long, 4–7 mm wide, cylindric-fusiform, beaked, villous; **seeds** 2 mm by 1 mm, brown, twisted and covered with transparent scales; **stamens** (5) 9–15, densely clustered about the ovary; **filaments** 4–5 mm long, the lower half of each expanded-caniculate, the upper half filiform; **anthers** golden, ca 1 mm long; **petal** 1, trapezoidal in front view, mitten-shaped in lateral view, with two narrow, upper lobes and two broader lateral ones, 8–11 mm long, colored like sepals but paler; **sepals** 5, petaloid, purple, blue or pink, tinged with white (or pure white), 5–10 mm long and broad, except for the uppermost, which forms a **spur** 7–16 mm long; spur long-attenuate, nectariferous; **pedicels** ribbed, villous, 2–12 mm long (up to 20 mm in fruit), often with tiny, villous **bracteoles**; **bracts** linear, single or branched, much like the leaves, villous; **inflorescence** a dense to open raceme 5–20 (30) cm long (see discussion of abnormalities below); **leaves** villous to almost glabrous, alternate, palmately divided and subdivided into many linear segments which are 1–3 cm long, 0.5–3.1 mm wide; total leaf width 3–7 cm, length 3–9 cm; **petioles** villous, caniculate, 0.1–8.0 cm long or leaf sessile; **stipules** absent or indistinguishable from leaves; **stems** terete, ribbed, sparsely to densely villous, often branched, up to 1.5 m tall from an annual **taproot.** (2n = 16)

Infraspecific Variation and Teratology: Flower color and size are variable, and large-flowered, color variants are much sought after in the seed trade. Teratological inflorescences are known in which stamens are borne on dense, leafy shoots which may arise from the pedicel bases in late season after fruiting.

Importance: These plants are much-cultivated and escape and persist in disturbed situations. Like *Delphinium* they contain the poisonous alkaloids: Ajacine, Delphinine, Delphineidine; these cause nervous system damage, depression, stomach upset and in quantity may result in death. This species is also listed as a cause of dermatitis in some people.

9. ANEMONE

Common Names: Windflower, Anemone

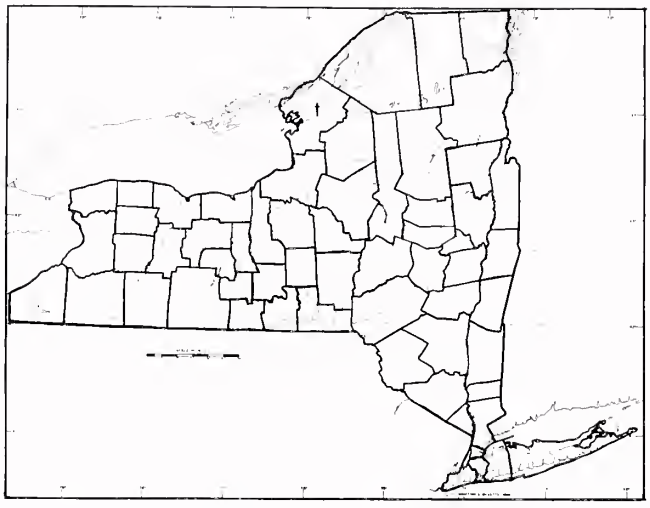
Authority: Linnaeus, Species Pl., p. 538, 1753

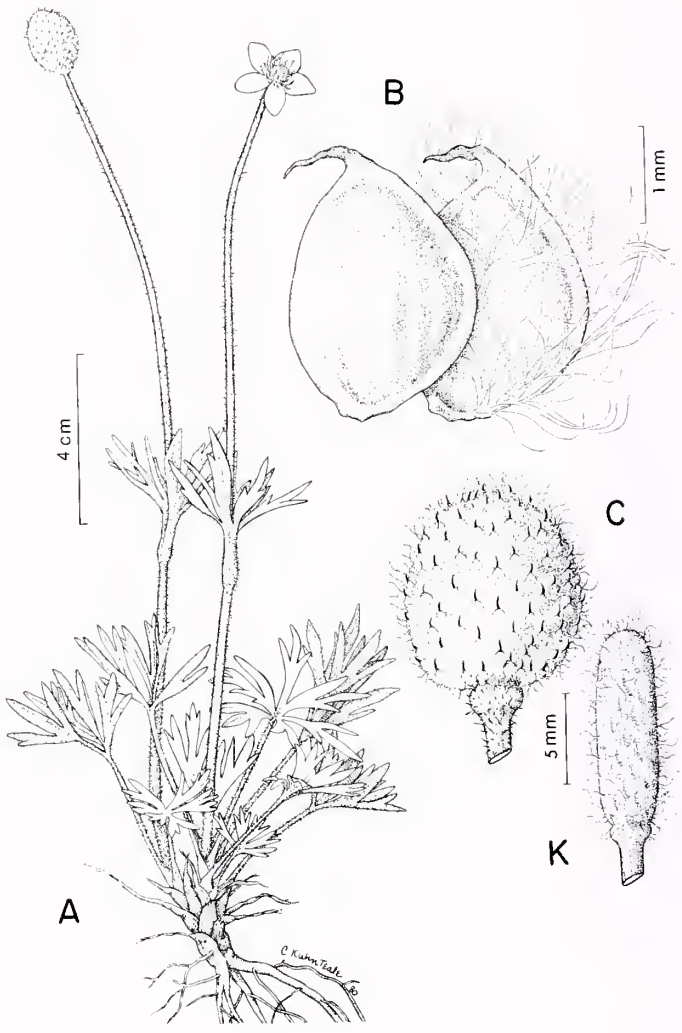
A genus with over 150 described species worldwide, mostly in cooler temperate and arctic regions. The number of species is probably fewer than 100, since races of many of them are given species rank in various geographic regions, and hybrids also confuse the taxonomic situation. The plants are often quite variable within populations, and sometimes from branch to branch. *Anemone* species are widely cultivated as garden ornamentals, the Pasque Flowers being particularly desirable (these are probably best treated as the segregate genus, *Pulsatilla*). A number of *Anemone* species are used medicinally for their alkaloids and acrid oils.

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, linear to punctate; **style** 1 per ovary, short to filiform, often pubescent; **ovaries** numerous on a hemishpheric to cylindric **receptacle** which may elongate in fruit; **ovaries** oval, fusiform or lenticular, with 1 (2) **ovules,** each producing a follicle-like **achene** with a single pendulous **seed; achenes** often silky or woolly, lenticular or fusiform, carried away from the ripe receptacle by the wind or fur of animals which may catch in the **persistent styles; stamens** numerous; **perianth** of a single series of free, petaloid parts (**sepals**), which are (4) 5–6 (15) in number, oval to elliptic-lanceolate or even linear, white, greenish or with weak to strong infusions of blue, yellow, purple, red or orange; **peduncles** usually elongate, slender, 1–several, often arising from an **upper node** ringed with 3 or more petioled or sessile **involucral leaves** ("bracts"); **involucels** also may be present above; **leaves** palmately divided (pinnately), variously cut, toothed and lobed; **basal leaves** and often involucre **petioled; stems** erect or spreading from a perennial **caudex** and/or **rhizome** with a tough, fibrous **root system.**

KEY TO SPECIES OF ANEMONE

1. Ripe achenes not woolly, partially glabrous or with whitish, hispid hairs; fruiting heads capitate to spheroid .....(4)
1. Ripe achenes densely matted with curly wool; fruiting heads ovoid-oblong or cylindric .....(2)
   2. Leaves deeply cleft to near the bases into many, narrowly lanceolate, 1 to 2-branched lobes; plants with 1 (rarely 2) flowers per stem .....1. *A. multifida* (p.)
   2. Leaves variously cut and toothed, but with major lobes expanded toward tips, not lanceolate; stem usually with 2–many flowers .....(3)
3. Mature fruiting heads cylindric, mostly 2–5 times as long as broad; styles crimson (drying red-brown), encroached upon by dense, woolly masses from the fruit coat; peduncles arising from a common point, 3–8 involucral leaves at the node, terminating the leafy portion of the stem .....2. *A. cylindrica* (p.)
3. Mature fruiting heads ovoid, 1–1.5 (2) times as long as broad; styles pale brown (stigmas red-tipped), villous to glabrescent, (styles) not dense-woolly; peduncles with 3 involucral leaves at their base, often with involucels above .....3. *A. virginiana* (p.)
   4. Involucral leaves strongly petioled; achenes uniformly hispid; plants slender, somewhat delicate .....4. *A. quinquifolia* (p.)
   4. Involucral leaves sessile or very short petioled; achenes strongly hispid near the convex centers, glabrate near the margins; plants coarse .....5. *A. canadensis* (p.)





1. ***Anemone multifida*** **Poir. ex Lam.**

Common Name: Cut-leaved Anemone

Type Description: Poiret in Lamarck, Encyc. Meth. Bot. Suppl. 1: 364, 1810

Synonyms: (New York populations) *Anemone hudsoniana* (DC.) Richards., *A. multifida* var. *hudsoniana* DC., *A. multifida* var. *uniflora* DC., *A. sanguinea* Pursh

Origin: Northwestern North America?

Habitats: (New York) Limestone outcrops and flatrock, along river bluffs

Habit: Perennial herbs, somewhat tufted, from a caudex

Flowering: May—June

Fruiting: June—August

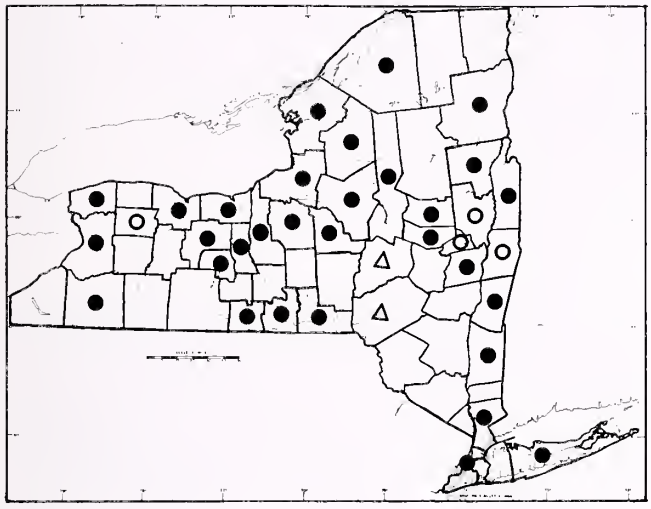
General Distribution: Alaska to the central Rocky Mountains, northern Great Lakes to Nova Scotia with southern outliers in California, New Mexico, New York and Vermont (also South America)

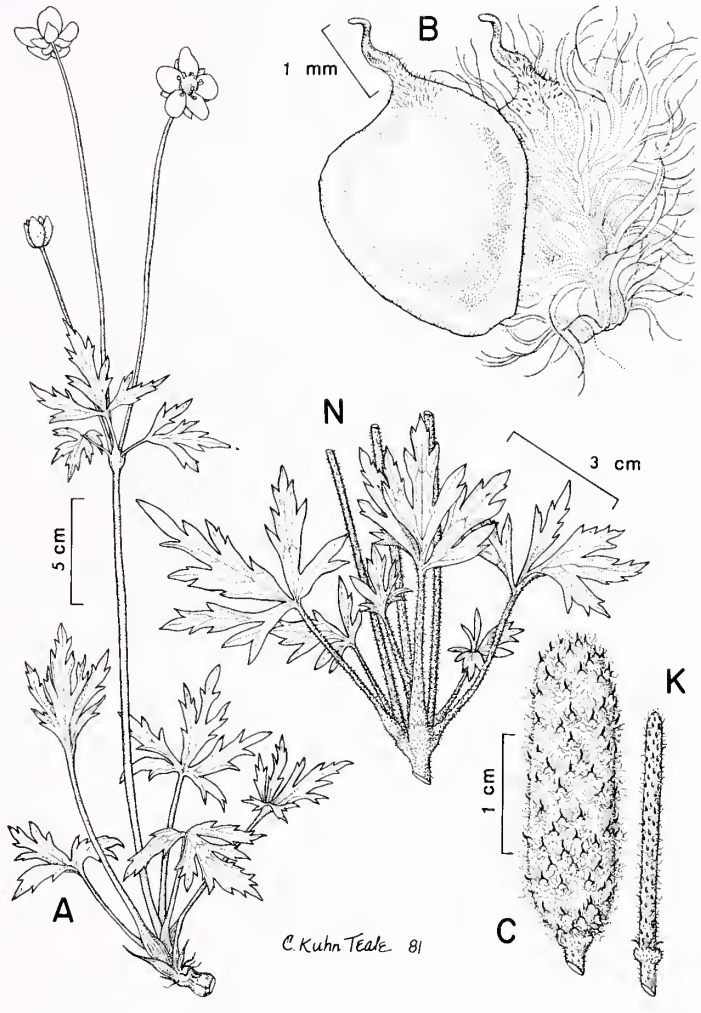
Note: The following description is for New York State populations only. Details of the broad range of variability in this species complex are deleted.

Rarity Status: Because of its rarity in the eastern U. S., this species has been proposed for protection in New York State. It is perhaps extirpated here, but might still be found in Jefferson County.

Description: Plants with **bisexual** flowers; **stigma** small, 1 per ovary, punctate; **style** 1 per ovary, cylindric, glabrous to near the base; **ovaries** many, fusiform, ca 2 mm long, extremely pubescent with a silvery tomentum, becoming woolly, fusiform **achenes,** 2 mm long, 1 mm wide; **seeds** 1 per fruit, pendulous; **receptacle** obconic, elongating to produce an ovoid **fruiting head,** 7–12 mm long, 5–9 mm wide; **stamens** about 15–20; **anthers** very small, golden; **filaments** upcurved, ca 2 mm long; **perianth** 5 parted, petaloid; **sepals** (3) 6–9 mm long, 3–5 mm wide, oval, strongly red-tinged to greenish-white; **peduncles** 3.5–16 cm long, sparsely to densely villous; **flowers** borne on peduncles, singly or as a pair from the upper node of each branch; **peduncles** subtended by 3 **involucral leaves** (bracts); involucral leaves simply ternate, petioled (not sessile as reported), consisting of deeply cut blades; **leaf lobes** of 1–3 narrowly-lanceolate segments, 1–3 mm wide, 2–16 mm long; **leaf blades** fan-shaped, 6–48 (55) mm wide, 5–36 mm long, sparsely villous to glabrous; **basal leaves** like the involucral ones, but often smaller and less pubescent; **petioles** 4–8 mm long (involucral) and 0.6 –13.5 cm long (basal), somewhat sheathing at their bases, sparsely villous to hispid; **stems** slender, with a single node, villous-hispid; plants up to 40 cm tall, from a woody **caudex** 4–7 mm thick, with slender, fibrous **roots.** (2n = 32,16?)

Infraspecific Variation: This species is extremely wide-ranging and variable. For an excellent discussion of the polyploid complex, see Boraiah and Heimburger (1964). Our plants are frequently referred to *A. hudsoniana* (2-flowered), but most specimens have a single flower, making them "var. *uniflora.*" Although flower number seems at first to be a trivial character, it appears to delimit certain geographic and morphological subunits in this particular species. Red flower color is reported for New York populations, but specimens are old, and since no living populations are presently known, it cannot be checked.





2. *Anemone cylindrica* Gray

Common Names: Thimbleweed, Long-headed Anemone, Thimblehead Anemone

Type Description: A. Gray, Ann. Lyc. N. Y., 3: 221, 1836

Origin: Northern North America

Habitats: Dry, open areas, grassy slopes, prairies, ditches and roadsides, waste places

Habit: Erect or ascending, perennial herbs

Flowering: June—August

Fruiting: July—October

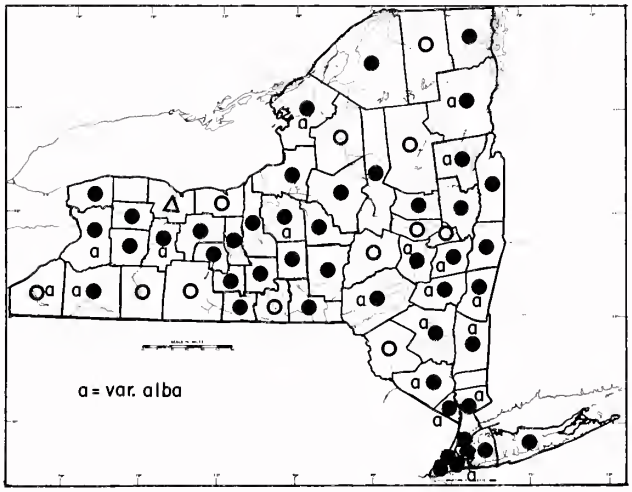
General Distribution: Maine across Canada to British Columbia, south to Arizona, Kansas, Ohio and New Jersey.

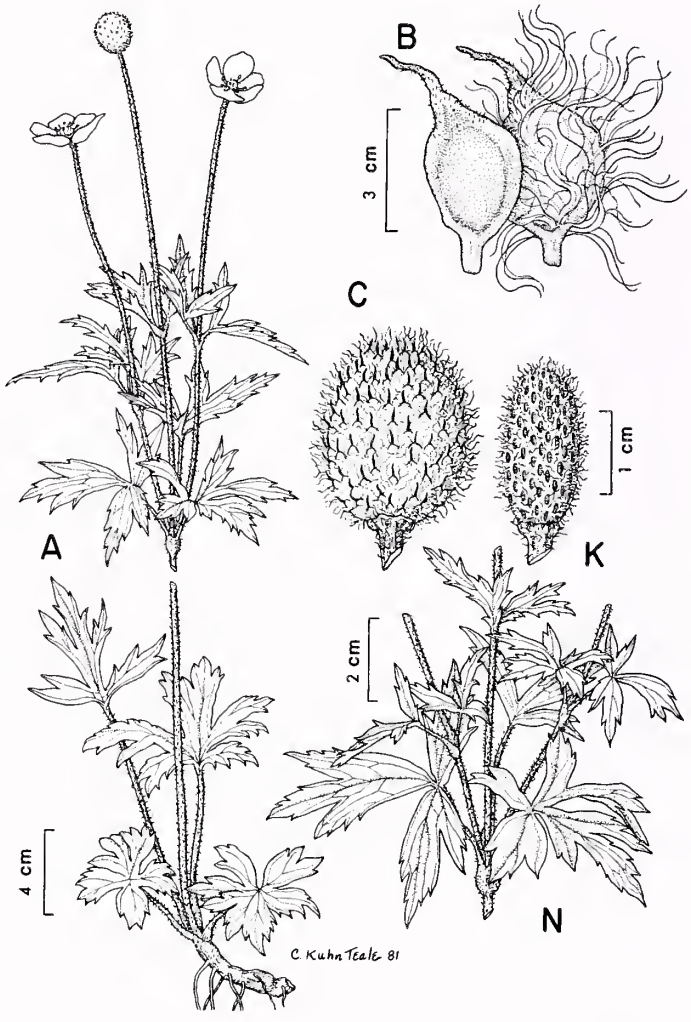
Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, minute, on a narrowly cylindric, crimson **style;** style villous, 0.5–1.0 mm long, often reflexed or hooked at the tip, encroached upon by woolly hairs from the ovary; **ovaries** numerous, ca 0.5 mm long, lenticular with a single **ovule,** hispid to densely woolly, on an obconic **receptacle** which elongates in fruit; **achenes** 1.5–2.5 mm long, pinkish, covered with a woolly knap; **seed** pendulous within the achene, 1–1.5 mm long; **fruiting heads** densely cylindric, 1.5–4.7 (6) cm long, 0.5–1.3 (1.8) cm wide before dispersal, often bearing over 100 achenes, becoming a fluffy mass, leaving behind a narrow, conical receptacle; **stamens** about 30–40, 2–4 mm long; **anthers** ca 1 mm long, golden; **filaments** filiform; **perianth** 5-parted, petaloid; **sepals** free, 5–7 (9), oblong to oval, 4–9 (12) mm long, 3–5 (7) mm wide, with rounded or obtuse tips, greenish white, creamy or rarely red-tinged, densely woolly-villous on the abaxial sides, almost glabrous within; **peduncles** reddish, very densely sericeous and white near the flowers, 6–25 cm long, **lacking involucels;** **inflorescence** of 2–6 (9) long, single-flowered peduncles, borne from a common point at the **vegetative apex;** vegetative apex with 3–6 (11) involucral leaves and **involucels** all borne from the same node; **involucral leaves** 3 to 5-palmately lobed with shallowly to deeply cut and branched (sometimes toothed) lobes which are cuneate and relatively narrow at the

bases (Geranium-like) 1.5–7.0 (10) cm broad and long, darker green above and sparsely sericious, pale below, densely sericious-silky; **basal leaves** like the involucral ones, but up to 12 cm in diameter, long-petioled; **petioles** reddish, sometimes grooved, sparsely to densely sericeous-woolly, 0.5–5.5 cm long in involucre, (5) 7–19 (24) cm long in basal leaves; stem reddish-brown (2) 4–9 (12) dm tall, from a single (rarely double) tough **caudex** ca 5 mm broad, with tough, fibrous **roots**. (2n = 16)

Infraspecific Variation: Putative hybrids between this species and *A. virginiana* are known, but not in sufficient numbers to suggest a clinal transition or warrent the two species being merged taxonomically, Obvious hybrids are rare, but have such unlikely combinations as broad-lobed leaves, involucels on the peduncles and narrowly cylindric fruiting heads. So-called *A. riparia* is of possible hybrid origin, and is discussed further under *A. virginiana*.

Importance: This species is sometimes a noxious weed, and is poisonous. Boiled extract was used by Indians in the treatment of wounds, utilizing the antiseptic properties of Anemonine.





3. *Anemone virginiana* L.

Common Names: Thimbleweed, Tall Anemone or Thimbleweed

Type Description: Linnaeus, Species Pl., p. 540, 1753

Synonyms: *Anemone riparia* Fern., *A. riparia* forma *rhodantha* Fern., *A. virginiana* var. *riparia* (Fern.) Boiv., *A. virginiana:* (forma *leucosepala* Fern., forma *rubrosepala* House and forma *inconspicua* Fern.), *A. cylindrica* var. *alba* Oakes

Origin: Eastern North America

Habit: Erect to ascending, perennial herbs

Habitats: Dry to moist, open woods, clearings, roadsides and streambanks

Flowering: June—August

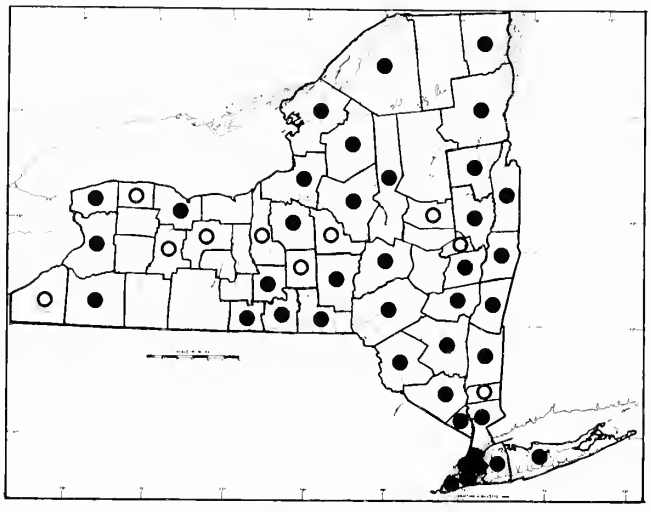
Fruiting: July—October

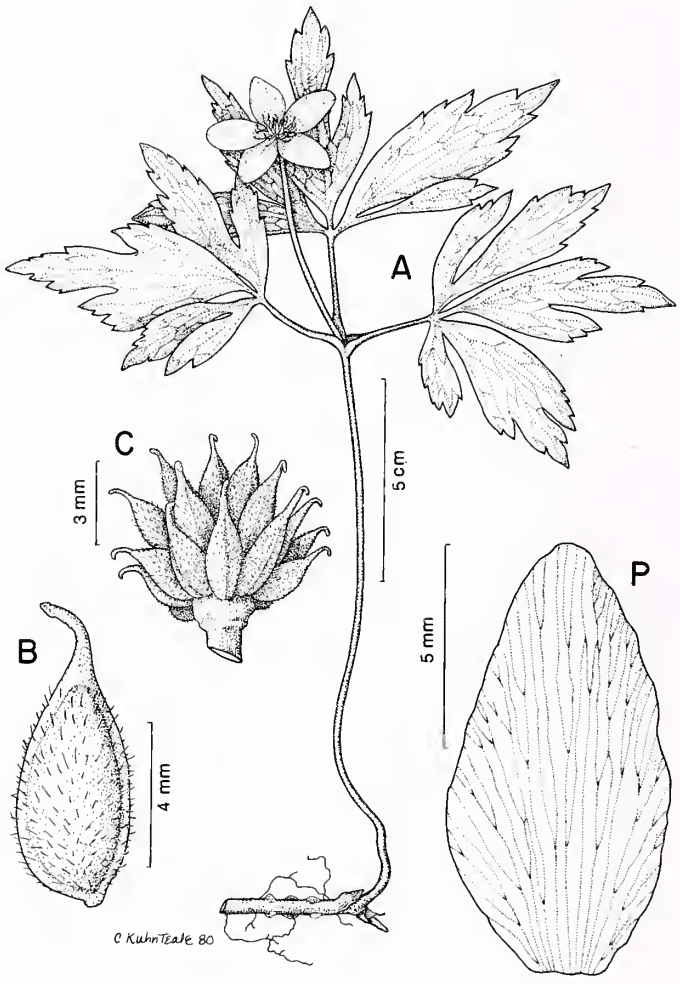
General Distribution: Newfoundland across Canada to British Columbia, south to Kansas, Arkansas and Georgia

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, minute, often reddish, on a tapered, greenish-tan **style**; style 1 per ovary, glabrous or with a few stiff, short hairs, ca 1.5 mm long, sometimes reflexed at the tip; **ovaries** numerous, ca 1.5 mm long, with soft, white hispidity (each containing a single **ovule**), borne on a swollen **receptacle** which elongates in fruit; **achenes** 1.5–2.2 mm long, lenticular, brownish-pink, covered with a silky to woolly knap, the short-haired to glabrous **beak** (style) projecting from the silk; **seed** pendulous within the achene,

1–1.5 mm long; **fruiting head** ovoid, (0.9) 1.5–3.2 cm long, (0.6) 0.9–2.8 (3.1) cm wide before dispersal, becoming a silky mass, leaving behind a short-cylindric receptacle; **stamens** about 30–40, 4–7 mm long; **filaments** filiform; **anthers** elongate, 0.7–1.7 mm long, golden; **perianth** 5-parted; petaloid; **sepals** free, usually 5 (6–9), oblong to elliptic-oval, 4–16 mm long, 3–12 mm wide, with rounded (to obtuse or acute) tips, white, creamy, greenish or rarely red- or rose-tinged, densely villous to woolly on the abaxial surfaces, sparsely pubescent to glabrous within; **peduncles** reddish-brown to green, very densely sericeous and white near the flowers, 5–21 cm long, less pubescent downward and often grooved or angled, sometimes with leaf-like **involucels** above the point of attachment; **inflorescences** of 2–5 (6) cm long, single-flowered peduncles, borne from a common point, this node usually bearing 3 **involucral leaves**; involucral leaves 3 to 5-palmately lobed with broadly rhombic-ovate segments, with mostly convex margins toward the base (cuneate in var. *alba*), 1.5–8.0 cm broad and long, sparsely to moderately hispid above, dark green, sparsely to moderately hispid below, paler green to pinkish; **basal leaves** like the involucral ones, but up to 18 cm in diameter, long-petioled; **petioles** somewhat villous, reddish to greenish-brown, 1.2–6.5 cm long in the involucre, 8–28 cm long in basal leaves; **stem** stout, greenish-brown, moderately to densely villous, (3) 5–8 (10) dm tall, from a tough **caudex**, 5–15 mm in diameter, with fibrous **roots**. (2n = 16)

Infraspecific Variation and Hybridization: This seldom-studied group of plants presents some interesting problems in variation. Almost undisputable hybrids between *A. virginiana* and *A. cylindrica* are known, which exhibit not only intermediacy but mixtures of the strong leaf characters of one species with the fruiting heads of the other. Though such plants are rare, they lend credence to the hypothesis that these species occasionally cross in nature. To confound this situation, there is *A. virginiana* var. *alba* Wood. Unlike other varieties or color forms (which can be largely discounted) this entity has a morphology, habitat and range of its own, and has been considered a full species, *A. riparia* Fern. The plants have somewhat larger flowers and smaller fruiting heads than *A. virginiana* var. *virginiana*, and the leaf shapes and head shapes tend toward *A. cylindrica*. The habitat is generally moister and often shadier than for either of the typical varieties of the two species. It is possible that this variety was derived through ancient hybridization of *A. virginiana* and *A. cylindrica*, and has now back-crossed to *A. virginiana* sufficiently to form a morphological bridge as well as an ecological cline. Variety *alba* has a much broader northern range than typical var. *virginiana*, and has apparently inherited the heterozygosity needed for postglacial invasion of cool, moist habitats—thus expanding the range of the species.





4. *Anemone quinquefolia* L.

Common Names: Wood Anemone, Snowdrops, Windflower

Type Description: Linnaeus, Species Pl., p. 541, 1753

Synonyms: *Anemone nemerosa* L. var. *quinquefolia* (L.) Pursh, *A. nemerosa* ssp. *americana* Ulbrich, *A. nemerosa* f. *quinquefolia* (L.) Britt., *A. pedata* Raf., *Anemonantha quinquefolia* (L.) Nieuwl., *Nemerosa quinquefolia* (L.) Nieuwl.

Origin: Ancient Arctotertiary Forest

Habit: Erect to ascending, slender perennial herbs

Habitat: Moist, often rocky woods, thickets and clearings

Flowering: April—June

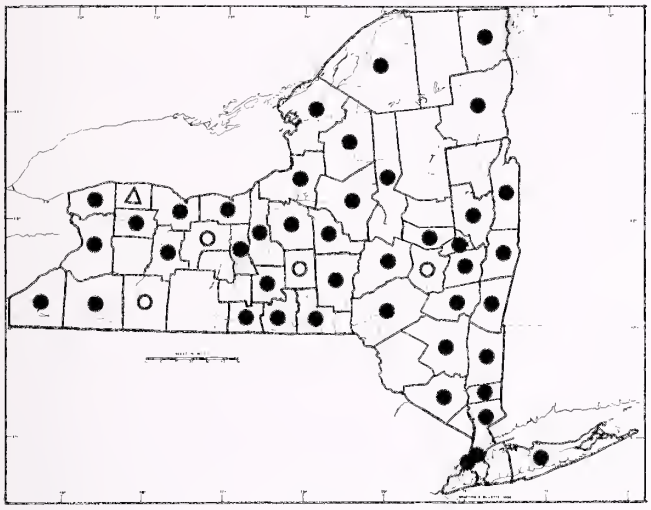
Fruiting: May—August

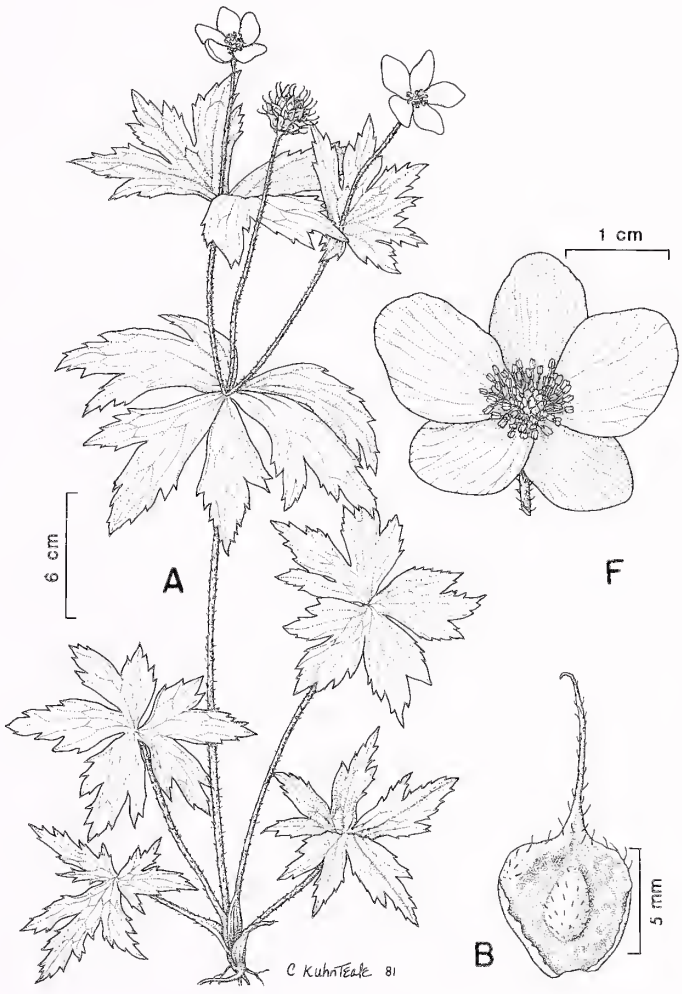
General Distribution: Quebec to Manitoba, Iowa; along the Appalachians south to Georgia

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, minute, on a tapered, glabrous, slightly recurved **style** ca 1 mm long; **ovaries** 8–18 (21), ca 1 mm long, covered with dense, white hairs, each ovary with a single **ovule** developing; **receptacle** small, capitate, enlarging little in fruit; **achenes** 3.0–4.5 mm long, densely hispid, red-brown, lenticular-ovate, 6–15 in number; **seed** pendulous, 1.5–2.5 mm long; **fruiting heads** capitate, ovoid to cylindric, 6–11 mm in diameter; **stamens** about 40–50; **anthers** minute, ovoid, golden; **filaments** slender, 1–5 mm long; **perianth** (4) 5–9 parted, petaloid; **sepals** free, broadly to narrowly oval, 0.5–1.6 (2.1) cm long, 0.4–1.3 (1.6) cm broad, the inner ones often narrower, white, creamy or tinged with red or blue, glabrous with more or less parallel, dichotomously branching, rarely anastomosing **veins; peduncles** slender, densely villous near the flower to less pubescent or nearly glabrous below, 1.8–6.4 long; **flower solitary,** borne on the terminal peduncle; **involucral leaves** (2–4), palmately divided, with 3 main lobes, the lateral ones often incised to, or near the base, making the leaf 5-lobed, variously cut, toothed and serrated, the **terminal leaflet** broadest at or above the middle, leaflets pubescent on the margins, glabrous or less commonly with patches of silky hairs on the surfaces, the leaves oval in outline, 2–8 (10) cm broad, with rhombic to lanceolate-cuneate segments; **basal leaf** like the involucral ones, but with a long petiole; **petioles** slender, 0.5–3.5 cm long in the involucre, 4–14 cm long from the base, villous to glabrous; **stem** slender, glabrous to villous, 4–20 cm (30) tall, from a slender, yellowish **rhizome** with tough, fibrous **roots.** (2n = 32)

Infraspecific Variation: This species belongs to the *A. nemerosa* complex which is widespread circumboreally and variable throughout. North American plants differ from European *A. nemerosa* mainly in stature, leaf lobing and venation of the sepals. Western *A. quinquifolia* var. *oregana* Rob. has larger, blue flowers on short peduncles.

Anemone piperi Britt. of the west shows much similarity to European plants, but has tough, brown, ascending rhizomes. In the southeastern United States the complex is represented by *A. minima* DC. and *A. lancifolia* Pursh, which are also difficult to distinguish to all but the best-trained eye. *Anemone quinquefolia* var. *interior* Fern. is merely a pubescence and branching form, found to be variable within populations (Keener, 1975a). This complex is much in need of study on a worldwide basis.





5. *Anemone canadensis* L.

Common Names: Canada Anemone, Windflower

Type Description: Linnaeus, Systema Nat., ed. 12, vol. 3, App. 231, 1768

Synonyms: *Anemone pennsylvanica* L., *A. dichotoma* L. var. *canadensis* McMill., *A. aconitiifolia* Michx.

Origin: Arctotertiary Forest

Habitat: Moist soil of open woodlands, shores, swales and marshy clearings

Habit: Erect or ascending, perennial herbs

Flowering: May—August

Fruiting: June—October

General Distribution: Gaspé to British Columbia, south to New Mexico in the west, Illinois, New England south along the Appalachians to West Virginia

Description: Plants with **bisexual** flowers: **stigma** minute, 1 per ovary; **style** 1 per ovary, recurved, 0.5–1.0 mm long in flower, persistent, becoming straight, up to 6 mm long, spine-like and short-pubescent in fruit; **ovaries** 15–40, each with one fertile **ovule** (one abortive); **receptacle** small, hemispheric, enlarging little in fruit; **achenes** (2) 8–35 in number, ovoid-lenticular to reniform, somewhat inflated, appearing winged due to the bulge of the single **seed,** villous on the seed-bulge, sometimes on the margins, but otherwise glabrate, red-brown, 3.5–6.0 mm wide, 3–5 mm long, excluding the prominent **stylar beak; fruiting heads** capitate to globose, ca 1.5 (0.5–2.2) cm broad (often partially infertile) with the appearance of a spiny globe; **seeds** ca 2 mm in diameter, distinctly outlined in the coats of the larger achenes; **stamens** about 35–60; **anthers** ca 1.5 mm long, oblong, golden; **filaments** 2–3 mm long, slender; **perianth** 5 (6–9) parted, petaloid; **sepals** free, 1–2 cm long, 7–14 mm wide, white (creamy) or pink-tinged, orbicular to narrowly oblong with rounded to obtuse tips (not uncommonly with undulate margins), finely

short villous on the abaxial surfaces, virtually glabrous within; **peduncles** 1–3, appressed-villous, 3–18 cm long, the lateral ones sometimes with **involucels**, each peduncle borne from a node with 3 **involucral leaves**; **flowers** borne singly, 1–3 per plant at the tips of the peduncles; **involucral leaves** sessile or nearly so, 3–15 cm broad and long, 3-lobed (often over half way to the bases), the lobes cuneate, acute tipped, usually sharp-toothed and lobed themselves, villous to glabrescent above, villous below; **basal leaves** with 3–5 major lobes, otherwise like the involucral ones, but petioled; **petioles** 9–24 cm tall from the plant base, villous, grooved, sheathing at bases; **stems** simple or branched, grooved, villous, up to 8.5 dm tall, from a short, tough (1–3 crowned) **caudex** and slender **rhizome** with fibrous **roots**. (2n = 14)

Importance: The plants are sometimes cultivated as an accent to shrubbery or in moist portions of gardens and yards. They escape outside their natural distribution range, and spread aggressively along highways.

10. HEPATICA

Common Names: Liverleaf, Liverwort

Authority: Miller, Gard. Dict. Abr. ed. 4, 1754

A genus of 2–5 species, depending on taxonomic interpretation. The plants are native to the boreal forests of Europe and eastern North America. They are separated from the genus *Anemone*, where they were placed originally, by their lobed (rather than compound) basal leaves and scapose flowers with involucres in the position of calyces. Two species usually recognized in the United States have been shown to be included in the broad range of variation of *H. nobilis* Schreb. (Steyermark & Steyermark, 1960), and are here treated as varieties of that widespread species. The Hepaticas are widely cultivated, and once were thought to cure liver ailments, due to the liver-like lobing of the leaves.

1. *Hepatica nobilis* Schreb.

Common Names: Liverleaf, Noble Liverwort, Heart Liverleaf, Kidney Liverleaf, Round-lobed Liverleaf (var. *obtusa*), Sharp-lobed Liverleaf (var. *acuta*) Livermoss, Crystalwort, Ivy flower, Herb-trinity, Squirrel-cup, "Spring Beauty", Hepatica

Type Description: Schreber, Spicel. Fl. Lips, p. 39, 1771

Synonyms: *Hepatica americana* (DC.) Ker., *H. acutiloba* DC., *H. triloba* Gilib., "H. *triloba* Chaix" of authors not accepting Gilib. as authority, *H. hepatica* (L.) Karst., *Anemone hepatica* L., *Anemone triloba* (Gilib.) Stokes (See Steyermark, 1960, for additional combinations made for varieties and forms of this species)

Origin: Arctotertiary Forest

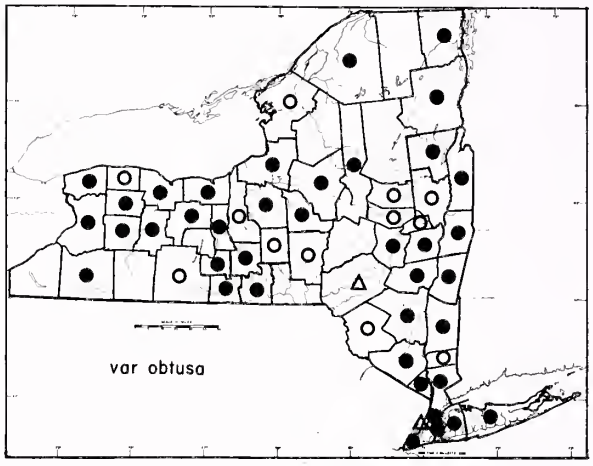
Habitats: Moist to dry woods and streambanks

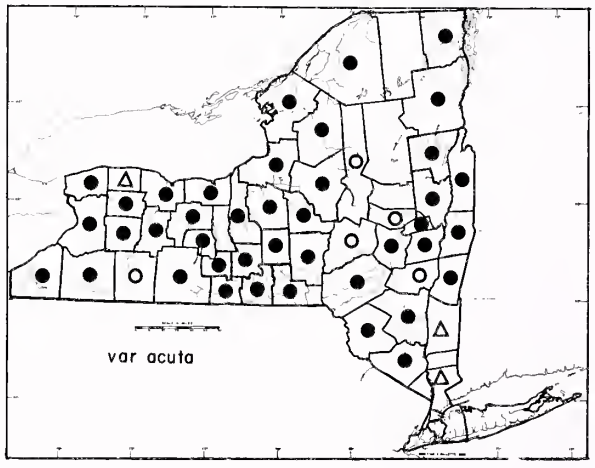
Habit: Scapose, perennial herbs; evergreen

Flowering: March—May

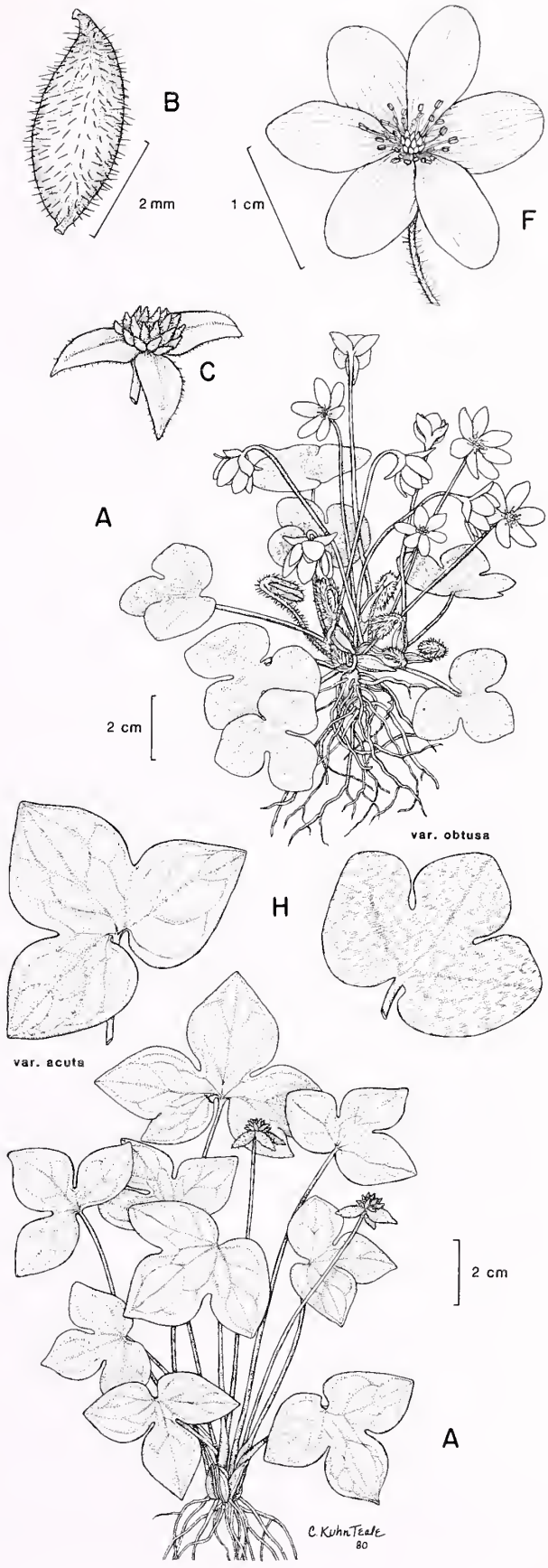
Fruiting: April—July

General Distribution: Nova Scotia to Quebec and Minnesota, south to Georgia with an outlier in Florida (widespread in Europe)





Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, minute to slightly capitate; **style** ca 1 mm long, often bent or reflexed with maturity; **ovaries** 8–15 (20), 1–1.5 mm long, fusiform, with a single **ovule**, hispid, each ovary becoming a fusiform to conic-ovoid **achene**; achenes (3) 8–15 (20), densely hispid, tan to dark brown, 4–5 mm long, ca 1.5 mm wide, borne in hemispheric to capitate clusters, subtended by the involucre; **seed** 1, 1–1.5 mm in diameter; **staminodes absent; stamens** numerous, 2–5 mm long; **anther sacs** minute, golden; **filaments** pale, slender; **perianth** of a single series of petaloid lobes; **perianth lobes** (**sepals**) free, (5) 6–12, oval to linear-oblong, pink, bluish, purple or white, 5–13 (17) mm long, 3–8 (11) mm wide, glabrous or rarely with a few hairs; calyx simulated by an **involucre** directly beneath the flower or up to 5 mm below it; involucre 3-lobed, green, lobes ovate with acute to obtuse or rounded tips, (5) 7–15 (18)mm long, 3–8 (10) mm wide, strongly villous, especially below (to nearly glabrous); **scapes** 1-several per plant, 3–15 (20) cm long, villous, slender, often arching, each bearing a **single flower; leaves** 2–10 cm wide, 2–6 cm long, 3-lobed (5–9, less commonly), cordate at the base, strongly villous to glabrescent, pale to dark, shiny green above, often with a blush of rose-purple or maculate, rose-purple beneath; sinuses cut ¼–½ the width of the blade, **lobes** oval to triangular-acute (or acuminate) with rounded to sharply pointed tips; **petioles** slender, 3–18 cm long, densely villous to glabrescent; **stipules** 5–18 mm long, greenish-yellow, oblong to lance-ovate, 3–8 mm wide, arising with the petioles on a short **caudex** at ground level; **rhizome** tough, 2–6 mm in diameter, with tough, twisted and knotted **roots.** (2n = 14)



Infraspecific Variation and Hybridization: It has been traditional to recognize two native species of *Hepatica* in North America. Steyermark and Steyermark (1960) presented convincing evidence that European and American plants show similar variation patterns on both continents and that overlap in characteristics allows no clear distinction between them. Their studies were backed by careful measurements made in the field and on a broad spectrum of herbarium materials. Though recent manuals have likened round-lobed *H. americana* to European *H. nobilis*, the type specimen of *H. nobilis* is closer to what American authors call *H. acutiloba*, round-lobed types being less

common in Europe. Both varieties are found on calcareous to neutral or slightly acidic soils in our range, neither being found predominantly on any soil type. The fact that hybridization occurs and is documented where they are sympatric does not mean that they do not largely maintain their integrity. But to recognize them at the species level when similar variation occurs in Europe only confounds the problem, not to mention nomenclature. Phenotypic modification of the main character of leaf-lobing has been noted after transplant into gardens. It seems appropriate in this case to treat the entities as varieties. Round-lobed plants may sometimes produce 5-lobed leaves; some populations of acute-lobed plants show a tendency to produce 5–9 acute to acuminate lobes per leaf and shallow sinuses. Teratological forms are known in which all flower parts develop into sepals, the inner ones being hispid like achenes.

KEY TO VARIETIES

1. Tips of leaf lobes rounded to blunt.....*H. nobilis* var. *obtusa* (Pursh) Steyerm.
1. Tips of leaf lobes acute to acuminate.....*H. nobilis* var. *acuta* (Pursh) Steyerm.

Importance: Hepaticas are relatively popular as garden plants for shaded areas. In ancient times they were thought to cure liver ailments due to leaf shape (by the Doctrine of Signitures). American Indians mixed roots with rhizomes of Maidenhair Ferns *(Adiantum)* for treatment of leukorrhea (*Candida* infections).

11. CLEMATIS

Common Names: Virgin's-bower, Leather-flower, Curlflower

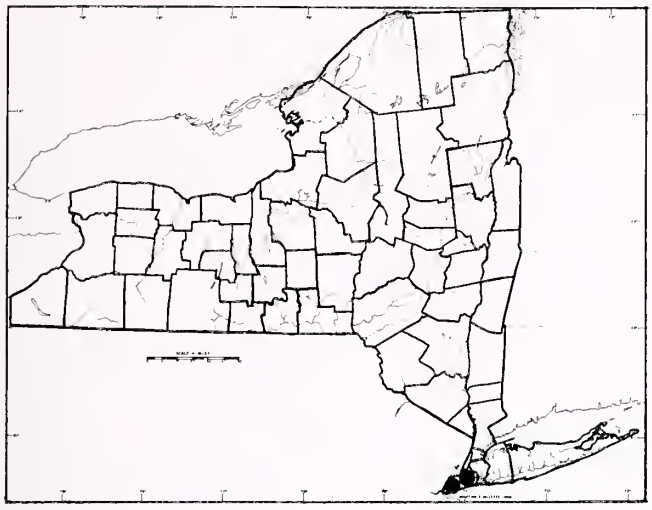
Authority: Linnaeus, Species Pl., p. 543, 1753

The genus *Clematis* has over 200 species worldwide and 25–30 native to boreal and subtropical North America. They are viny or herbaceous and widely cultivated for their great variety of flower colors and shapes, as well as their showy clusters of plume-like fruits. New York State has three native species, one introduced species which escapes cultivation on occasion and two which very rarely escape.

Description: Plants with **bisexual** flowers, **dioecious** or **polygamodioecious; stigma** 1 per ovary; **style** 1 per ovary, elongate, persistent, becoming plumose in fruit; **ovaries** 8–12 (20), becoming **achenes;** achenes usually copiously pubescent (along with their plumose styles) forming feathery masses at maturity; **seed** 1 per fruit, with a **raphe,** suspended; **stamens** numerous, often cohering; **staminodes** present or absent; **perianth** of a single series of parts; **perianth lobes** (**sepals**) nearly free to connivent, forming an urceolate cup in some, valvate in bud, a great variety of colors from white or greenish to red, blue, orange or purple; **inflorescence** a panicle, or flowers borne singly (strongly nodding in some species); **peduncles** slender, flexuous (twining in some); **leaves** opposite, simple or usually pinnately or ternately compound; **leaflets** membranaceous to quite leathery, toothed, lobed or entire; **petioles** and **rachises** prehensile in some, aiding the vining process; **stipules** present or absent; **stems** erect, herbaceous to slightly woody or sprawling and vining, arising from tough, perennial **rootstocks.**

KEY TO SPECIES OF CLEMATIS

1. Leaves simple, sessile or nearly so; plants erect or ascending, not viny; petaloid sepals leathery, forming a cup .....1. *Clematis ochroleuca* (p.)
1. Leaves compound, strongly petioled; plants vining or sprawling; petaloid sepals thin, spreading or drooping .....(2)
   2. Flowers or fruit-clusters single in the leaf axils; petaloid sepals 2.5–5 cm long, purplish.....2. *Clematis occidentalis* (p.)
   2. Flowers or fruit clusters borne in panicles; petaloid sepals white or creamy, less than 1.8 cm long....(3)
3. Leaflets toothed and lobed, dentate to crenate, borne mostly in threes.....3. *Clematis virginiana* (p.)
3. Leaflets usually entire, not toothed and rarely lobed, borne mostly in fives ....4. *Clematis terniflora* (p.)



1. *Clematis ochroleuca* Ait.

Common Names: Leatherflower, Curlyheads

Type Description: Aiton, Hort. Kew., vol. 2, p. 260, 1789

Synonyms: *Clematis sericea* Michx., *Viorna ochroleuca* (Ait.) Small

Origin: Eastern North America

Habitats: Dry, gravelly soil, clearings, thickets, cliffs, open woods (serpentine soil in New York State)

Habit: Erect-ascending, perennial herbs

Flowering: May—June

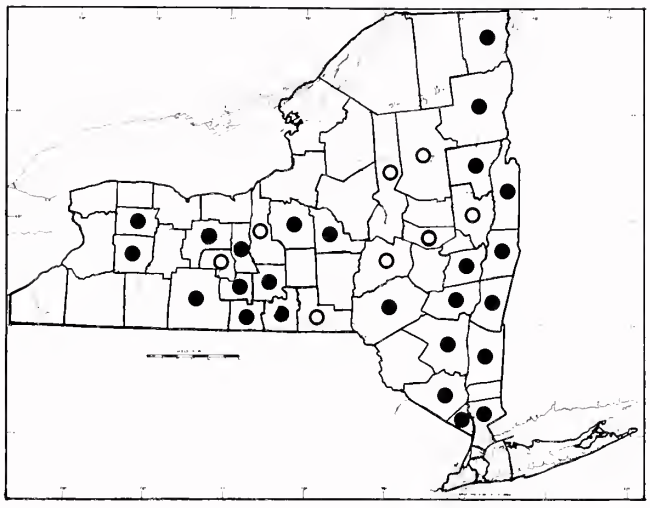
Fruiting: June—August

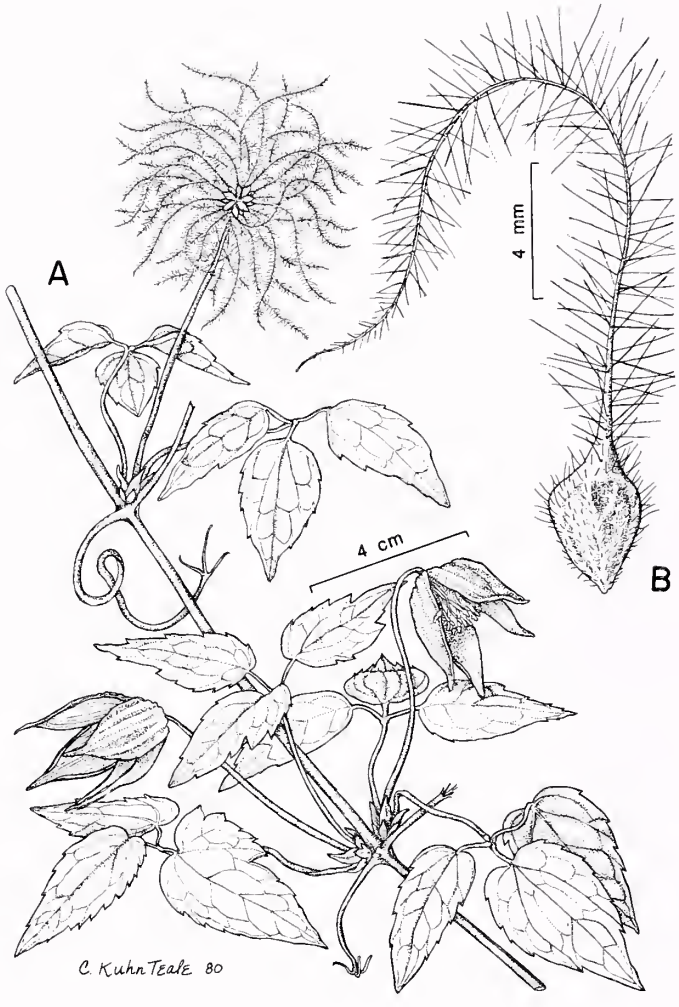
General Distribution: (Staten Island, New York) Pennsylvania along the Appalachian Piedmont to Georgia

Rarity Status: This species is very rare in New York State (Staten Island only), and appears on the State list of endangered and threatened species

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, minute; **style** 1 per ovary, 10–15 mm long, cinnamon brown, filiform, densely hispid above to woolly-villous below, persistent, becoming a wiry, flexuous, tawny-hispid **plume,** 4–5 (6) cm long in fruit; **ovaries** 25–40, ca 1 mm long, densely crowded on a dome-like receptacle, becoming distorted, pyriform **achenes;** achenes 3–4.5 mm long, with short, ascending or slightly spreading hairs grading upward into the hispidity of the plumose style; **stamens** numerous, 10–15 mm long; **anthers** linear, 6–9 mm long apiculate tipped; **filaments** winged, 5–10 mm long; **perianth** of a single series of lobes; **perianth lobes** (**sepals**) usually 4, leathery, free, but curved to form a cup, obspatulate-acuminate to lanceolate with reflexed or curled and contorted tips, (sepals) 1.1–2.6 cm long, 4–9 mm wide, yellowish to purple, but with a highly reflective silver-gray sheen due to the densely sericious abaxial surfaces; **peduncles** 4–15 cm long, growing between flowering and fruiting; **flowers** borne singly at the branch apices; **leaves** opposite, entire (or dentately toothed or lobed), usually sessile 3–9 (12) cm long, 1.5–6 (9) cm wide, broadly to narrowly ovate with obtuse to rounded (acute) tips coriaceous, prominently yellowish-reticulate veined, mature leaves moderately sericeous-pilose below, less so above; **petioles** absent or villous, 1–4 (7) mm long; **stipules absent; stems** ribbed, reddish brown, densely silky-pilose to glabrescent, usually with short **side branches** (better developed at lower nodes), erect, 4–9 dm tall, arising from a tough, **perennial stock** with fibrous **roots.** (2n = 16)

Infraspecific Variability: Leaves of some plants may be toothed and lobed, while those of others are entire.





2. *Clematis occidentalis* (Hornem.) DC.

Common Names: Purple Clematis, Purple Virgin's-bower

Type Description: Hornemann, Hort. Reg Bot. Hafn., vol. 2, p 520, 1815

Synonyms: *Clematis verticillaris* DC., *C. hexagona* Eat., *Atragene americana* Sims, *A. occidentalis* Hornem.

Origin: Northeastern North America

Habitats: Rocky, often calcareous woods and thickets

Habit: A climbing or sprawling vine (rarely dwarfed)

Flowering: May—June

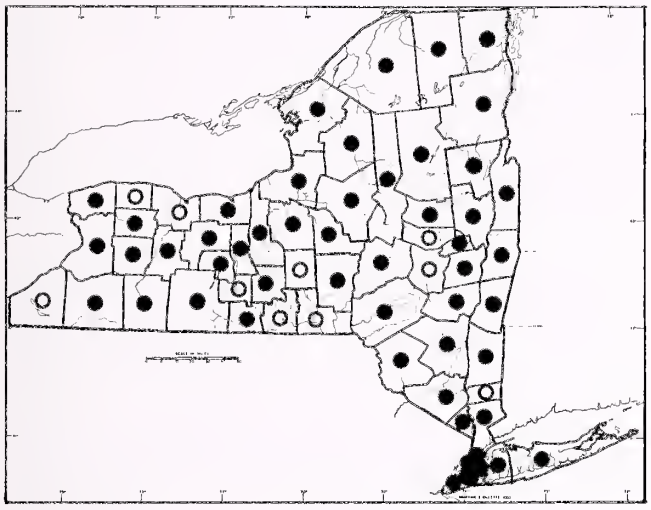
Fruiting: July—September

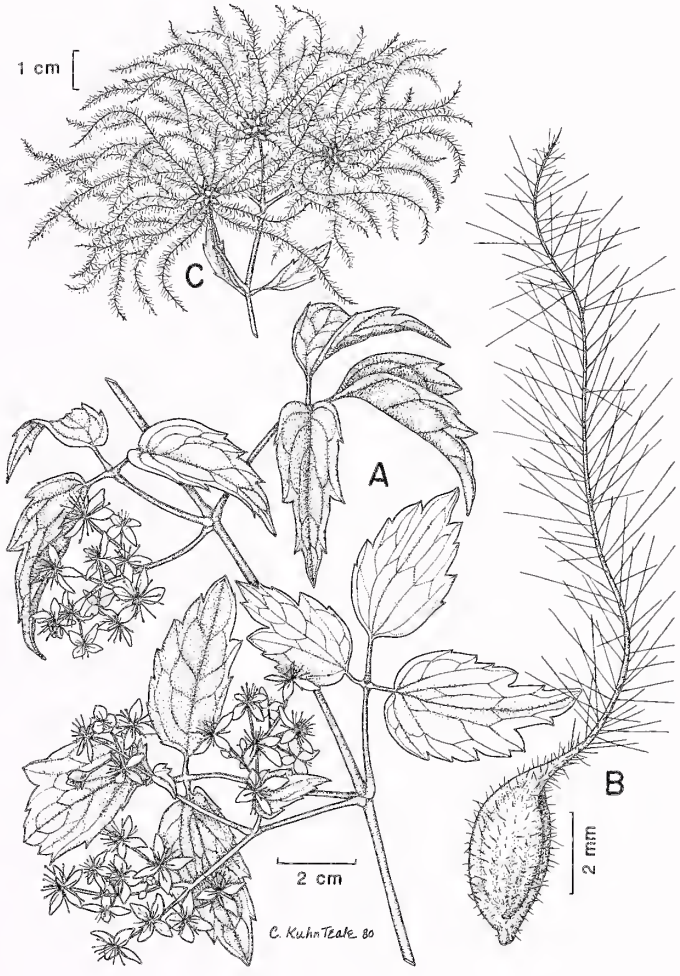
General Distribution: eastern Quebec to Manitoba (Washington State), south to Iowa, New Jersey, scattered along the Appalachians to Virginia (cultivated elsewhere)

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, punctate; **style** 1 per ovary, filiform, 7–13 mm long, covered with pale, appressed hairs, persistent in fruit becoming a flexuous, silvery-hispid **plume** 3–5 cm long; **ovaries** 30–40, ca 1 mm long, pilose, with a single **ovule,** densely crowded on a dome-like **receptacle,** becoming a subglobose **head of achenes; achenes** lenticular-ovoid, reddish brown, 3–4 mm in diameter, hispid; **seed** 1 per fruit, ca 2.5 cm in diameter; **stamens** numerous, 1.0–1.5 cm long; **filaments** mostly over 1 cm long, pubescent or glabrous, winged, with the broadest part of the wing (near the anther sacs) up to 3 mm wide (intergrading with staminodia); **anther sacs** golden, 2.5 mm long or smaller (to obsolete); **staminodia** like the filaments or spatulate, up to 5 mm broad at the rounded tips, somewhat petaloid, often villous; **perianth** of 4 large, petaloid sepals; **perianth lobes** (**sepals**) 2.5–3.8 (6) cm long, 0.9–1.6 (2.5) cm broad, mauve-purple or less commonly blue-violet (white), prominently reticulate veiny, thin (nearly translucent), oblong-elliptic to broadly lanceolate with obtuse to acuminate (or mucronate) tips, with fine, pubescent areas especially along the margins; **peduncles** 4–7 cm long, arising from within the bud scales, ribbed villous to glabrous; the large **flowers** (4–8 cm in diameter) borne singly, usually nodding, in the axils of the leaves; **bud scales** numerous, ovate, 4–6 mm long, 2–3 mm wide, sericeous to almost glabrous within; **leaves** opposite, trifoliate; **leaflets** 2–9 cm long 1–5.5 cm wide, unlobed and ovate, or 2–3 lobed, truncate to cordate at the bases, the margins subentire to dentate or deeply serrate, sparsely villous to glabrescent; **petiolules** and **petioles** villous, petioles often twining, up to 7 cm long; **nodes** enlarged; **internodes** reddish brown to green, usually glabrous; **stem** somewhat woody, climbing up to 30 ft (or trailing) from a perennial **rootstock.** (2n = 16)

Infraspecific Variation: Flower color varies from reddish-purple to blue (rarely white). Variety *grandiflora* Boivin, has large flowers with sepals about 6 cm long. Fernald's var. *cacuminis* was based on immature flowers and deserves no recognition. A short, tufted type of plant occurs disjunct in Washington State, and bears the name var. *dissecta* (C. L. Hitchc.) Pringle.

Importance: This is one of the more beautiful and desirable native plants for cultivation. It is grown all over the boreal world as a trellis plant, and bred for color and flower size.





3. ***Clematis virginiana*** **L.**

Common Names: Virgin's-bower, "Woodbine", Devil's Darning-needle, Love-vine, Devil's-hair, Traveler's-joy

Type Description: Linnaeus, Amoen., vol. 4, p. 275, 1759

Synonyms: *Clematis canadensis* Mill., *C. virginica* (in Pursh), *C. fragrans* Salisb., *C. cordifolia* Moench., *C. purshii* Dietr.

Origin: Eastern North America

Habitats: Clearings, thickets, open woods and borders, fencerows, roadsides and waste places, usually in poorly drained soil and relatively strong sunlight

Habit: A tangled, matted, perennial vine, sprawling or climbing

Flowering: July—September

Fruiting: August—November

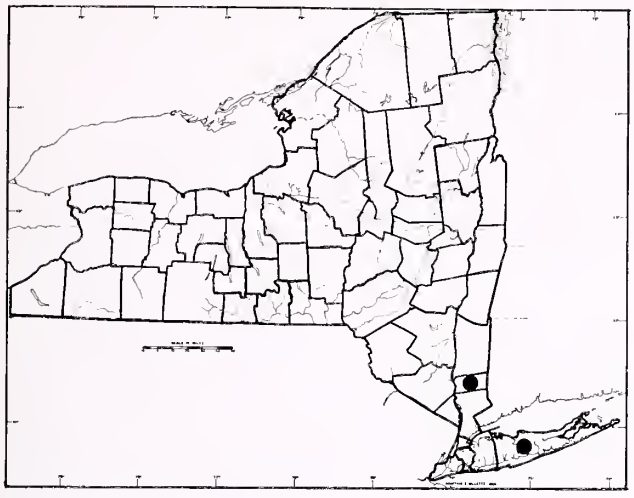
General Distribution: Nova Scotia to Manitoba, west to Nebraska, south to Louisiana and northern Florida

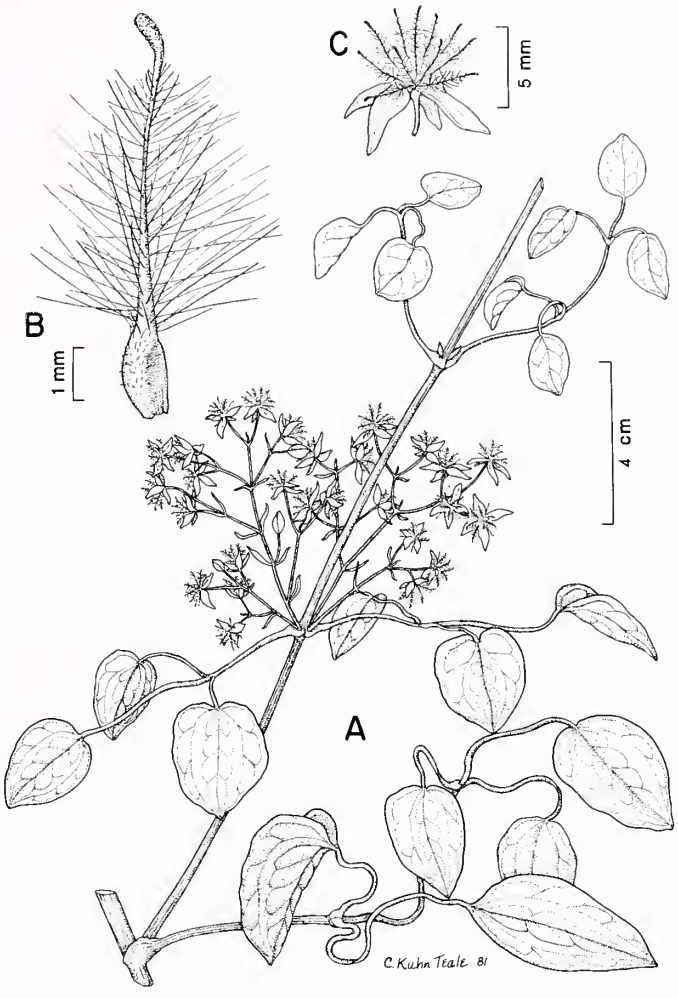
Description: Plants **polygamo-dioecious** or with primarily **bisexual** flowers; **stigma** 1 per ovary, minute; **style** 1 per ovary, filiform, 4–8 mm long, densely covered with silvery, ascending hairs, persistent in fruit, becoming a slender, flexuous, tawny-hispid **plume** 2–3 (4) cm long; **ovaries** 30–50 (60), about 1 mm long, villous, single ovuled, densely crowded on a dome-like **receptacle**, becoming a subglobose **head of achenes**; **achenes** elliptic-lenticular

with rib-like margins, falcately distorted toward the persistent style, tan and brown, 2.5–3.5 (4) mm long, 1.5–2.0 mm wide, short-hispid; **seed** 1 per fruit, ca 1.5 mm in diameter; **stamens** 15–25 (30), 2–5 mm long; **filaments** dilated or filiform; **anther sacs** less than 1.4 mm long, golden; **perianth** of a single whorl of 4 free, petaloid lobes; **perianth lobes** (**sepals**) white to ivory, oblong to oval with acute to rounded tips, 8–13 (17) mm long, 2–7 mm wide, sericeous on the adaxial surfaces with densely tomentose bands along the margins, glabrescent within; **pedicels** and **peduncles** villous, ribbed; **inflorescence** of several to many highly-branched panicles borne in the leaf axils; **bracts** like the leaflets or reduced upward to lanceolate, villous structures as few as 2 mm in length; **inflorescence buds** axillary, densely villous; **leaves** opposite, trifoliate (rarely a five-foliate leaf in ours); **leaflets** similar to one another, on puberulent to glabrous **petiolules** of about equal length (1–3 cm), (**leaflets**) 2–10 cm long, 1–8 cm wide, ovate to lanceolate with acute to acuminate tips and obtuse to truncate or oblique-cordate bases, margins (subentire) usually coarsely dentate with mucronate tips or serrate, minutely revolute, often lobed, but not regularly or deeply, very sparsely pilose or nearly glabrous (pilose in a western variety), thin-textured; **petioles** pilose to glabrous, up to 15 cm long, reflexing and entangling other branches and substrates; **nodes** enlarged; **stems** puberulent, greenish to yellow-brown, somewhat woody, climbing or sprawling up to 7 m from a fibrous, perennial **rootstock.** (2n = 16)

Infraspecific Variation: This species is a member of a complex whose major variants lie outside our range. Its two most closely related species are *C. catesbyana* Pursh of the southeast and *C. ligusticifolia* Nutt. of the midwest and west. These species are reported to intergrade (Keener, 1975), and are in need of further study. *Clematis virginiana* L. var. *missouriensis* (Rydb.) Palmer & Steyerm. commonly has 5-foliate leaves which are densely pilose beneath.

Importance: This species is an aggressive weed in our range, dragging down livestock fences, invading woodland borders and shading out more delicate vegetation. It can be quite showy on roadsides and fencerows, and is sometimes cultivated as a trellis plant.





4. *Clematis terniflora DC.*

Common Names: Virgin's-bower, Yam-leaved Clematis

Type Description: DeCandolle, Syst., vol. 1, p. 138, 1824

Synonyms: *Clematis maximowicziana* Franch. & Sav., *Clematis dioscoreifolia* Levl. & Van., *C. paniculata* Thunb., *C. paniculata* var. *dioscoreifolia* Rehd.

Origin: Japan

Habitats: Escaping cultivation to hedgerows, along railroad tracks and in waste places

Habit: Climbing or sprawling vines

Flowering: July–August

Fruiting: August–November

General Distribution: Native of Japan, escaping cultivation in Europe and the United States

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, linear-clavate ca 1 mm long; **style** 1 per ovary, 3–4 mm long, filiform, densely tufted with silvery hairs, persistent in fruit, becoming a flexuous, silvery-hispid **plume,** 1.8–2.5 (3) cm long; **ovaries** 5–8 (10), ca 1 mm long, with erect, silvery, short, appressed hairs, **single-ovuled,** mostly erect on a small **receptacle,** becoming a dense **cluster of achenes**; **achenes** oval, glabrous or minutely appressed-pubescent, 5–7 (9) mm long, 2–4 mm wide; **seed** 1 per fruit, ca 3 mm in diameter; **stamens** (9) 10–22 in number, (3) 4–8 mm long; **filaments** 2–5.5 mm long, filiform to slightly flattened; **anther sacs** 1.5–2.8 mm long, oblong, golden; **perianth** of a single whorl of 4, free, petaloid lobes; **perianth lobes** (**sepals**) oblong to linear-spatulate, 0.6–1.3 (1.7) cm long, 3–6 mm wide, white to creamy, flocculose in bud, the mature sepal glabrescent except for densely tomentose bands along the abaxial margins; **pedicels** and **peduncles** sparsely to densely tomentose or villous; **inflorescence** of few to many branched panicles borne in the leaf axils; **bracts** minute, villous, linear to spatulate, grading into leaflets below; **inflorescence buds** axillary, minute, floccose; **leaves** opposite, usually 5-foliate (or trifoliate); **leaflets** orbicular to ovate-cordate with obtuse to rounded tips (less commonly lobed), 1–6 (9) cm long, 1–5 (7) cm wide, glabrous to puberulent, coriaceous with arching major veins (much as in a yam, *Dioscorea*) and entire margins which are often undulate; **petiolules** and **petioles** sharply grooved (caniculate), villous to glabrous, petioles up to 11 cm long, twining, flexuous; **nodes** somewhat enlarged; **stems** deeply caniculate-grooved, mostly glabrous, greenish-tan, slightly woody, vining up to 5 m from a tough, perennial **rootstock.** (2n = 16, 48, 64)

Importance: This species is commonly cultivated as a trellis plant.

Rare Garden Escapes: Two additional species of *Clematis* are known to escape cultivation in New York State very rarely; these are *C. recta* L. and *C. viticella* L. *Clematis recta* is herbaceous, but erect-ascending, with a somewhat shrubby appearance and fragrant, white flowers. *Clematis viticella* is a climber with giant purple, rose or white flowers.

12. RANUNCULUS

Common Names: Crowfoot, Buttercup, Spearwort

Authority: Linnaeus, Species Pl., p. 548, 1753

This is a genus of 250–300 species, widely distributed world-wide in arctic to boreal and subtropical climates. Habitats vary from alpine fell-fields to dryish sandy sites, deep forest, palustrine or fully submerged-aquatic situations. They are sometimes cultivated in moist gardens. Buttercups usually contain acrid juices and may be regarded generically as poisonous.

Description: Plants with **bisexual** flowers (rarely polygamous); **stigma** 1 per ovary, small; **style** 1 per ovary (or obsolete), often persistent in fruit; **ovaries** few to very numerous, uniovulate, spirally arranged on a glabrous or pubescent **receptacle,** becoming a globose to narrowly cylindric **head of achenes**; **achenes** often **beaked** with a persistent style, their surfaces usually firm (spongy to papery), glabrous to hispid or muricate; **stamens** ten (rarely fewer) to many; **staminodes absent** in normal flowers; **perianth** of two whorls; **petals** yellow or white (rarely red-tinged), often 5 in number (absent to numerous), early or late deciduous, short to long-clawed at base, with a small, simple, adaxial **nectary gland** and an associated **scale** (rarely absent) toward the petal base; **sepals** often 5 (3–6, rarely absent) usually green (or yellowish to purple), spreading or reflexed; flowers on elongating **pedicels** or **peduncles,** single, axillary, or **inflorescence** obscurely corymbose or cymose; **leaves** simple to highly lobed and compound, often with marginal **hydathodes**, leaf shape often modified by water contact or submergence, [CO_2], temperature or day length; plants frequently **heterophyllous** and often with morphological differences between cauline and basal leaves; **cauline leaves** usually alternate, often dissected and sessile; **basal leaves** usually larger, less dissected or entire and petioled; **petioles** usually sheathing at the bases; **stems** erect to prostrate, sometimes slightly succulent, often hollow, bases fibrous to fleshy, annual or perennial; **stolons** often present, the plants perennating by them, or by **corms** or **rhizomes**; **roots** filamentous to fleshy-succulent.

Hybridization: Hybridism is seldom reported for *Ranunculus*. This is surprising given the gross similarity of the flowers and the morphological similarity, if not intermediacy, of many of the eastern North American species. Indeed it may be possible that several "species" may merely be based on a few dominant characteristics. Sobel (1977) has shown that *Ranunculus abortivus* and its allies, *R. micranthus* and *R. allegheniensis* are apparently interfertile. It might have been interesting to include other small-flowered Buttercups like *Ranunculus recurvatus* in these breeding experiments. So little is known about the genetics and reproductive biology of eastern North American species that the wisest course, at present, seems to be to adopt a very traditional species concept.

KEY TO RANUNCULUS SPECIES

1. Plants with submersed, aquatic leaves dissected into numerous, capillary segments.....(2)
1. Plants without capillary-dissected leaves (even if submersed).....(4)
   2. Petals white, (often yellow-clawed); achenes transversely ridged, not corky at bases .....(3)
   2. Petals yellow; achenes not transversely ridged, corky thickened at bases .....1. *Ranunculus flabellaris* (p.)
3. Beak of achene (0.3) 1.0–1.5 mm long; leaves somewhat rigid, retaining their outline when removed from water; style ± straight, subulate, persistent.....2. *Ranunculus longirostris*(p.)
3. Beak of achene absent or merely an apiculate remnant of the deciduous style (0.1–0.3 mm long); leaves usually flaccid, collapsing and not retaining their outline when out of water; style subulate or capitate, usually bent 90° from near base, deciduous .....3. *Ranunculus trichophyllus* (p.)
   4. Sepals 3; leaves ovate with cordate bases; stigma sessile (style obsolete); small bulbils produced in leaf axils after flowering .....4. *Ranunculus ficaria* (p.)
   4. Sepals usually 5; leaves various; style short to elongate; bulblets absent from axils of leaves.....(5)
5. Pericarp of achene thin, papery, surface with longitudinal ribs, glabrous (vegetatively with small, rounded-crenate leaves and stolons; halophytic).....5. *Ranunculus cymbalaria* (p.)
5. Pericarp of achene firm or spongy, not longitudinally ribbed, surface glabrous, papillate, pubescent or spiny .....(6)
   6. Basal leaves lanceolate, linear or spatulate.....(7)
   6. Basal leaves dissected, deeply lobed or unlobed, but not lanceolate, linear or spatulate .....(8)

7. Plants with slender, arching stolons; leaves narrow, tufted, blades not expanded or less than 1 cm wide; sepals 2–4 mm long ..... 6. *Ranunculus reptans* (p.)
7. Plants adventitiously rooting from stout, prostrate bases; leaf blades 1–3 cm wide; sepals 5–7 mm long ..... 7. *Ranunculus ambigens* (p.)
8. Leaves all simple, unlobed, the lower ones ovate to oblong, occasionally with shallow dentations ..... 8. *Ranunculus pusillus* (p.)
8. Leaves (cauline) commonly deeply lobed or compound ..... (9)
9. Achenes (ovaries) smooth, pubescent, shallowly pitted or minutely papillate but not spiny ..... (11)
9. Achenes (ovaries) spiny ..... (10)
10. Spines of achenes slender; petals (1–) 3–4 mm long; achenes about 1.5 (–3) long ..... 9. *Ranunculus parviflorus* (p.)
10. Spines of achenes stout; petals 4–8 (–12) mm long; achenes about 5 (–7) mm long ..... 10. *Ranunculus arvensis* (p.)
11. Basal leaves all dissected or lobed, not ovate, circular or reniform ..... (14)
11. Basal leaves undissected and dissected, ovate circular or reniform ..... (12)
12. Beak of achene (style) straight or slightly curved, 0.2 mm long or less; achenes about 1.3 (1.1–1.5 mm long ..... (13)
12. Beak of achene (style) strongly recurved, 0.7–1.0 mm long; achenes about 1.8 (1.5–2.0) mm long ..... 11. *Ranunculus allegheniensis* (p.)
13. Basal leaves reniform or circular in outline; leaf bases cordate; receptacle pubescent throughout ..... 12. *Ranunculus abortivus* (p.)
13. Basal leaves ovate; leaf bases cuneate or truncate; receptacle mostly glabrous (sometimes pubescent at the summit only) ..... 13. *Ranunculus micranthus* (p.)
14. Terminal leaflets with definite, unwinged petiolules; larger leaves mostly compound ..... (18)
14. Terminal leaflets or lobes without definite petiolules (or narrowed to wings at base); larger leaves merely deeply lobed ..... (15)*
15. Achenes flattish, compressed, conspicuously beaked; plants pubescent (except a form of *R. recurvatus*) ..... (16)
15. Achenes biconvex, plump, minutely beaked; plants glabrous ..... 14. *Ranunculus sceleratus* (p.)
16. Stigma minute and terminal, usually deciduous; beak 1.0–2.3 mm long, subulate to deltoid ..... (17)
16. Stigma lateral on the upper portion of the style, persistent; beak 0.4–1.0 mm long, deltoid ..... 15. *Ranunculus acris* (p.)
17. Achene beak hooked or coiled; petals about 5 mm long ..... 16. *Ranunculus recurvatus* (p.)
17. Achene beak subulate, ± straight; petals 7–14 mm long ..... 17. *Ranunculus hispidus* (p.)
18. Plants with bulbous, corm-like bases; sepals strongly reflexed at their bases ..... 18. *Ranunculus bulbosus* (p.)
18. Plants without corm-like bases; sepals spreading, not reflexed but occasionally lax with age ..... (19)
19. Plants stoloniferous ..... (22)
19. Plants not stoloniferous ..... (20)
20. Stem bristly-hairy; achenes in a cylindric head; petals less than 6 mm long, not longer than sepals ..... 19. *Ranunculus pensylvanicus* (p.)
20. Stems villous or hispid, not bristly; achenes in a globose head; petals over 6 mm long, longer than sepals ..... (21)
21. Larger leaves pinnately divided; some roots fusiform-tuberous ..... 20. *Ranunculus fascicularis* (p.)
21. Larger leaves 5-palmately divided (or ternate); fleshy roots narrowly elongate, not fusiform ..... 17. *Ranunculus hispidus* (p.)
22. Achene beak 1.5–3.0 mm long; stigma minute, terminal, usually deciduous in fruit ..... 17. *Ranunculus hispidus* (p.)
22. Achene beak 0.7–1.4 mm long; stigmatic surface somewhat diffuse on upper portion of style, usually persistent in fruit ..... 21. *Ranunculus repens* (p.)

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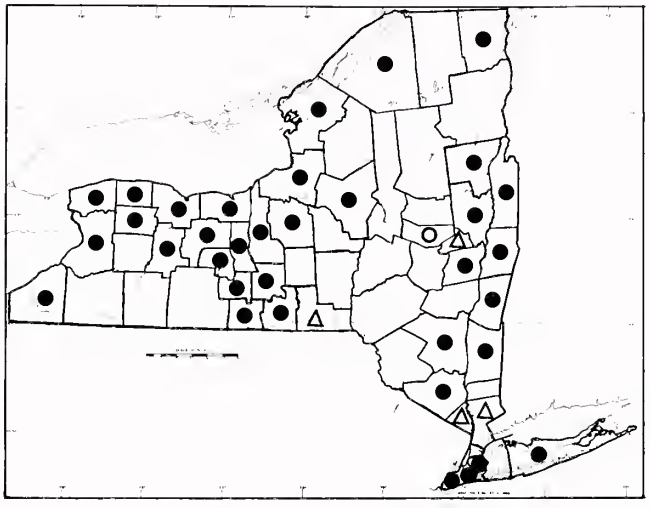
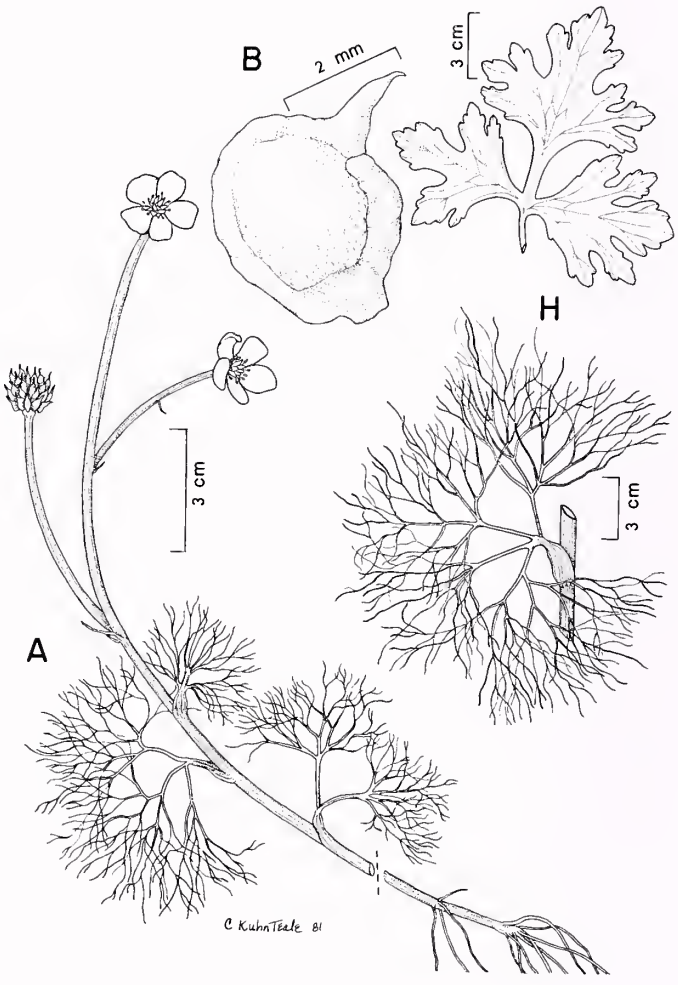
* Sterile, emergent plants of *R. flabellaris* will key to this point.





1. *Ranunculus flabellaris* Raf. ex Bigel.

Common Name: Yellow Water-crowfoot

Type Description: Rafinesque in Bigelow, Amer. Mo. Mag. 2: 344, 1818

Synonyms: *Ranunculus multifidus* Pursh, *R. delphinifolius* Torr., *R. lacustris* Beck & Tracey, *R. fluviatilis* Bigel.

Origin: Boreal North America

Habitats: Shallow water or damp ground of swamps, thickets, ponds and ditches

Habit: Palustrine or aquatic perennials

Flowering: May–July (September)

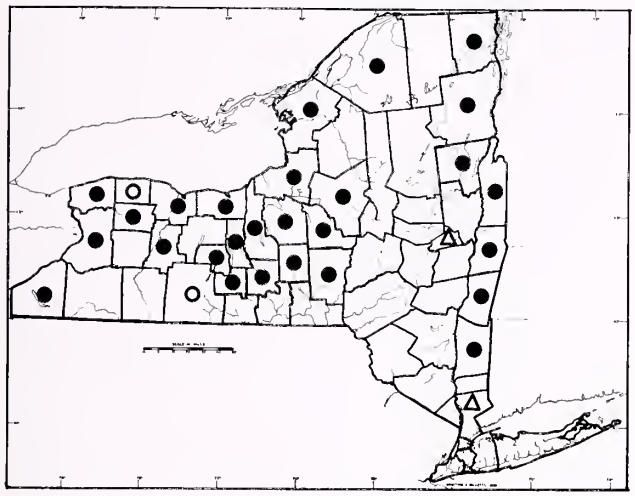
Fruiting: May–July (September)

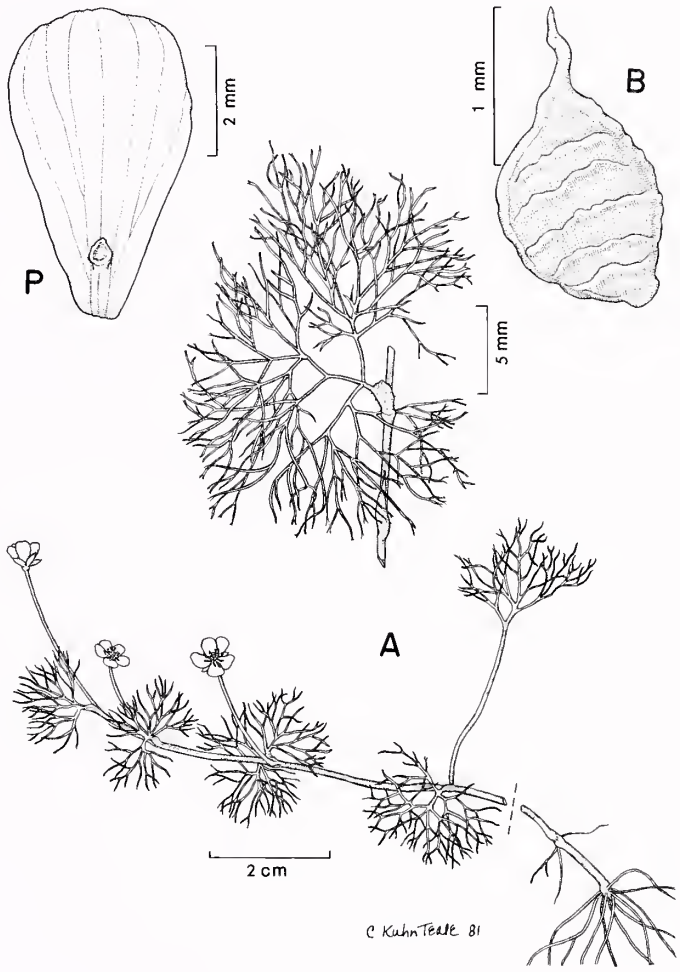
General Distribution: Maine to British Columbia, south to North Carolina, Louisiana, Oklahoma, Utah and California

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, small, apical; **style** 1 per ovary, terete, tapered, eccentric, sometimes bent, ca 0.5 mm long; **ovaries** (35) 50–75, about 2 mm long, arranged spirally on a compact, ovoid, somewhat hairy **receptacle**, 2–3 mm long, becoming an ovoid **cluster of achenes**; **achenes** 1.5–2.5 mm long, each with a **persistent style** (**beak**) ca 1 mm long, often at a right angle to the achene body, achene surfaces glabrous with a spongy covering of **floatation tissue** on the lower third of the achene, extending to the base of the beak on the ventral side and about ¾ the way up the dorsal side, the remainder of the dorsal side keeled; **stamens** 50–80; **anthers** oblong, 1–1.5 mm long; **filaments** often flattened, 2.5–3.0 mm long; **petals** 5 (6–8), yellow, obovate, glabrous, 7–22 mm long, 4–14 mm wide, with a **primary nectary scale** 1.5–2 mm long, partially adnate to the petal base, but with free sides and notched tip; **nectary gland** at the base of primary scale covered by a short **secondary scale**; **sepals** 5, yellow-green, glabrous, ovate, 5–12 mm long, 4–7 mm wide, spreading, deciduous before petals; **inflorescence** obscurely racemose, of solitary flowers on elongating **petioles**; petioles 0.5–12.0 cm long (in flower); **bracts** small, auricled; **leaves** alternate; **emergent leaves** generally reniform in outline and ternate, the ultimate lobe 3-toothed or lobed, the lateral ones less regularly incised, sometimes to near the base, leaf blades 0.4–4.5 cm broad; **submerged leaves** with much-divided blades ovate-cordate to reniform in outline, 1.5–10. cm long, 2–12 cm broad; triternately dissected or forked into flaccid, flattened, linear-filiform or narrowly oblong segments 1–2 mm wide; **petioles** 1–20 cm long; **stipules** present, up to 6 mm long, adnate to petioles with broad, flaring, ciliate margins; **stems** branched, hollow, floating or sprawling on mud; **roots** adventitious at the lower **nodes**, especially in stranded plants.

Infraspecific Variation: Like most plants which approach the amphibious habit, this species may be confusing due to heterophylly.

Importance: As a colonizer of swamp pools, this species is eaten by waterfowl and provides excellent habitat for small invertebrates and minnows. *Ranunculus* species are reported to be poisonous.





2. *Ranunculus longirostris* Godr.

Common Names: White Water-crowfoot, Stiff Water-crowfoot

Type Description: Godron, Mem. Soc. Roy. Nancy, vol. 1839, p. 39, 1840

Origin: North America

Synonyms: *Ranunculus subrigidus* Drew (N.Y. reports), *R. circinatus* of Amer. auth. not Sibth., *R. hydrocharis* Spenn. forma *longirostris* (Godr.) Hiern., *R. aquatilis* var. *longirostris* (Godr.) Lawson, *R. circinatus* var. *subrigidus* (Drew) Benson (N.Y. reports), *Batrachium longirostre* (Godr.) F. Schulz, *B. usneoides* Greene

Habit: Perennial aquatics with submerged leaves and stems

Habitats: Lakes, ponds, slow streams, in basic to circumneutral water

Flowering: June–August

Fruiting: June–September

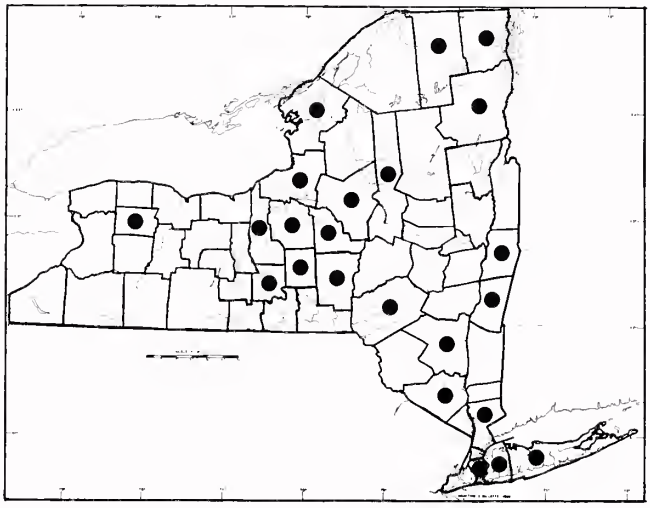
General Distribution: Mostly continental in the Northern United States and adjacent Canada, scattered southward to Deleware, Tennessee, Texas, New Mexico and Arizona

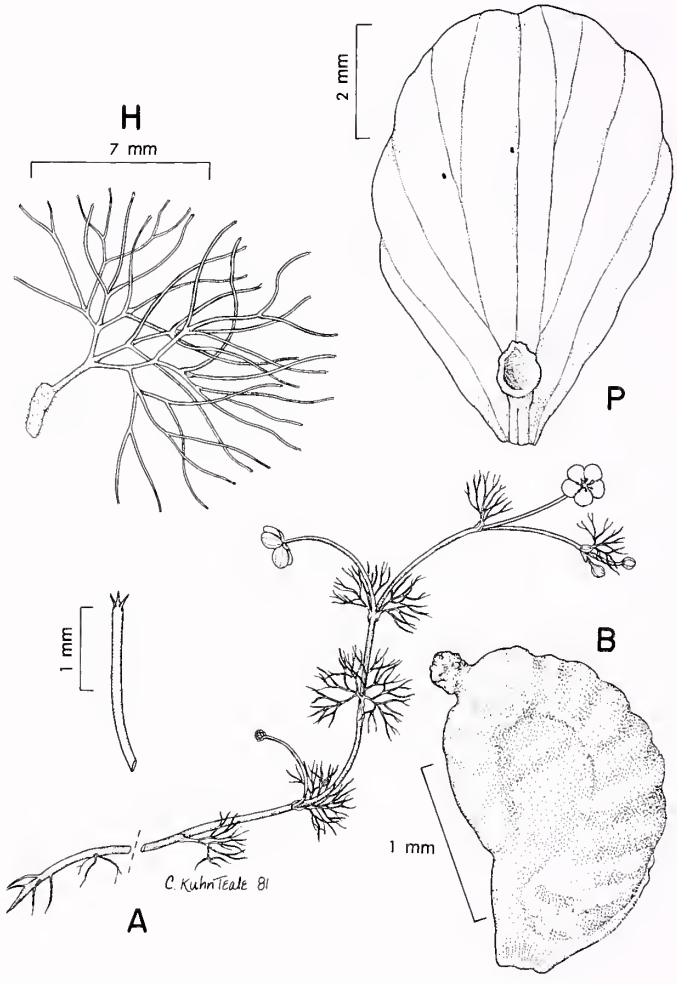
Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, minutely glandular, diffuse over ⅓ to all of the style; **style** 1 per ovary, ± straight, apical but adaxially eccentric; **ovaries** (7) 16–20 (25), ca 1 mm long on a hispid, globose or clavate receptacle, becoming a globose **head of achenes** up to 6 mm in diameter in fruit; **achenes** plump, biconvex, obovate, 1.3–1.7 mm long, transversely ridged, margined, glabrescent; **persistent style (beak)** 0.3–1.5 mm long, straight or ± twisted; **stamens** 10–20, hypogynous, about 1.5 mm long; **anthers** ca 0.5 long, elliptic; **petals** usually 5, white with a yellow blotch at the base, obovate, clawed, 4–9 mm long, 2–5 mm wide; **nectary scale** situated adaxially above the petal claw, forming a small pocket, a crescent-shaped ridge or obsolete;

nectariferous gland minute (less than 0.3 mm wide); **sepals** 5, 3–5 mm long, 2–3 mm wide, ovate, cucullate, yellowish-green to purplish on margins, spreading or tardily reflexed, deciduous; **flowers solitary,** emergent, 1 to several per branch, terminal (or appearing axillary due to sympodial growth of stems); **pedicels** 3–5 cm long, glabrous; **leaves homophyllous,** submerged unless stranded, alternate, hemi-circular to venate with truncate to cordate bases, 1–2 cm broad, dissected into numerous **capillary segments,** but stiff, usually retaining their shape when removed from water, the leaf segments twice trichotomously branched near the leaf base, dichotomously branched distally; **petioles** obsolete or up to 2 mm long connecting the blade with its sheathing **stipular base;** stipular sheaths adnate for ½–¾ of their 4–8 mm lengths, auricled, hispid-fringed and sometimes pubescent below; **stems** hollow, branched, about 2–3 mm in diameter, sometimes pubescent, not lacunate, up to 2 m long; **internodes,**especially the lower ones, much longer than the associated leaves; **lower nodes** often with filiform **roots,** the plants sometimes reproduced vegetatively by **rooting fragments.** (2n = 32)

Infraspecific Variation: Plants somewhat intermediate between this species and *R. trichophyllus* are known. To further confuse matters, an entity described as *R. subrigidus* Drew is vegetatively intermediate, but has a larger number of achenes per head, [30–45 (80)] than any New York State specimens seen.

Importance: *Ranunculus* species are reported to be poisonous to mammals, but this species is eaten by waterfowl.





3. *Ranunculus trichophyllus* Chaix ex Vill.

Common Names: White Water-crowfoot, Limp, White Water-crowfoot

Type Description: Chaix, in Vill., Hist. Pl. Dauph., p. 335, 1786

Synonyms: "*Ranunculus aquatilis* L." of New York authors, *R. capillaceus* Thuill, *R. aquatilis* var. *capillaceus* (Thuill.) DC., *Batrachium trichophyllum* (Chaix) Schultz (for extensive synonymy of the species, see Drew, 1936; Cook, 1966)

Origin: Uncertain (circumboreal and austral)

Habitats: Streams, rivers and lakes

Habit: submerged, aquatic perennials

Flowering: June–August

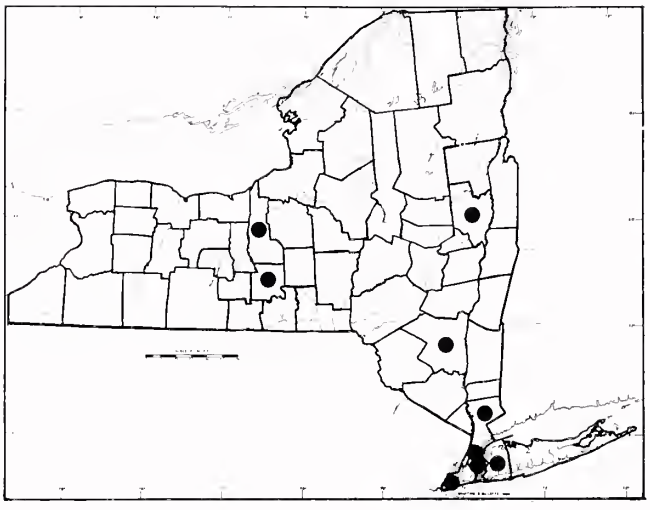
Fruiting: June–August

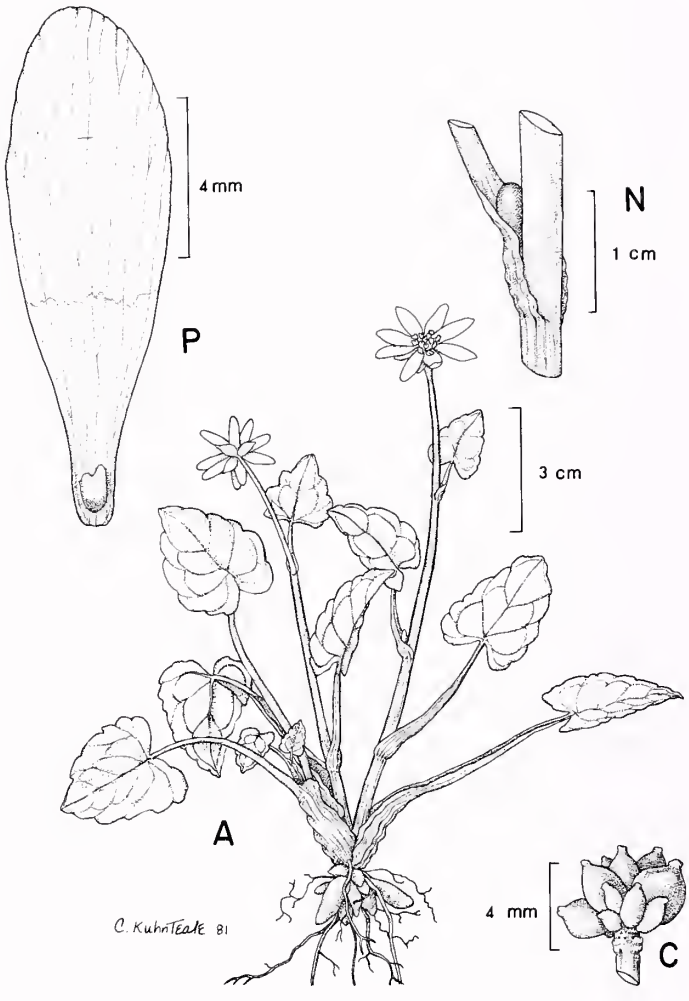
General Distribution: Boreal North America and Eurasia, eastern Australia (in North America south to North Carolina and Baja California)

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, diffuse over most of the **style**; style 1 per ovary, clavate or slenderly subulate, 0.3–0.7 mm long, apical but adaxially eccentric, often bent 90° from near the base, deciduous in fruit; **ovaries** 10–25, ca 1 mm long, usually densely hispid with two types of hairs, some hairs constricted at base and deciduous, ovaries clustered on a globose or clavate, hispid to glabrous **receptacle**, becoming a globose **head** up to 3.5 mm in diameter; **achenes** plump, biconvex, obovate, 1–1.5 mm long, transversely ridged, margined, glabrous or hispid, apiculate or slightly **beaked** by a small **style remnant** 0.2–0.5 mm long; **stamens** (5) 10–25 (30), hypogenous, 1.5–2.1 mm long; **anthers** short-elliptic; **petals** usually 5, white, with a yellow blotch at base, 4–8 mm long, 2–4 mm wide, clawed; **nectary scale** generally reduced to a crescent-shaped ridge or obsolete; **nectariferous gland** located on the petal near its base adjoining the claw; **sepals** 5, 3–6 mm long, somewhat cucullate, yellowish-green (rarely purple-tipped), spreading, deciduous; **flowers** 1—several per plant, terminal or seemingly axillary due to sympodial growth, solitary on individual **pedicels**; pedicels 1–6 cm long, recurved, mostly submerged; **leaves homophyllous**, submerged unless stranded, alternate, much dissected, flabelliform, 1.5–6 cm long, variously contorted by water currents and usually collapsing when drawn from the water, limp, dissected into capillary segments, once to several times trichotomously branched near base, dichotomously branched distally, often minutely pubescent, the tips minutely hispid usually with at least a pair of tiny hairs; **petioles** 2–20 (40) mm long (rarely sessile toward the apex of the **stipular base**; stipular sheaths 1–5 mm long, adnate to the petiole at least for ⅔ its length, auricled or tapering, glabrous to hispid; **internodes** about as long as their associated leaves; **stems** hollow, ca 1 mm thick, up to 2 m long, glabrous or pubescent, not lacunate; **roots** filiform, usually associated with the lower **nodes**, the plants sometimes reproducing by **rooting fragments** (2n = 32)

Infraspecific Variation: Plants with glabrous mature achenes and receptacles have been called *R. aquatilis* var. *calvescens* Drew. Plants of streams and cold, running water in the Catskills, Adirondacks and on Long Island have long leaf segments, diffuse leaves and long internodes when compared with plants of lakes and ponds of the western and northwestern parts of the state. Whether these differences are phenotypically induced or the product of a genetically based dimorphism remains to be studied experimentally. As with *R. longirostris*, some plants show the intermediate characteristics of *R. subrigidus* Drew, but do not have enough achenes per head to be referred to that taxon. Hybrids with *R. longirostris* are suspected.

Importance: These plants are colonizers of swift flowing streams where little else will grow. They provide habitat for microinvertebrates. *Ranunculus* species are reported to be poisonous.





4. *Ranunculus ficaria* L. ssp. *bulbifera* Lawal. ex Rob.

Common Names: Lesser Celandine, Pilewort, Pilewort Buttercup, Crain, Wordsworth's-flower, Fogwort, Golden Cup, Golden Guineas

Type Description: Linnaeus, Species Pl., p. 550, 1753

Synonyms: *Ficaria verna* Huds., *F. ranunculoides* Moench., *F. ficaria* (L.) Karst.

Origin: Europe

Habitats: Moist ground, streambanks, pastures, lawns, open woods and waste places

Habit: Low growing, sprawling or erect perennial, often forming pure stands

Flowering: April–May

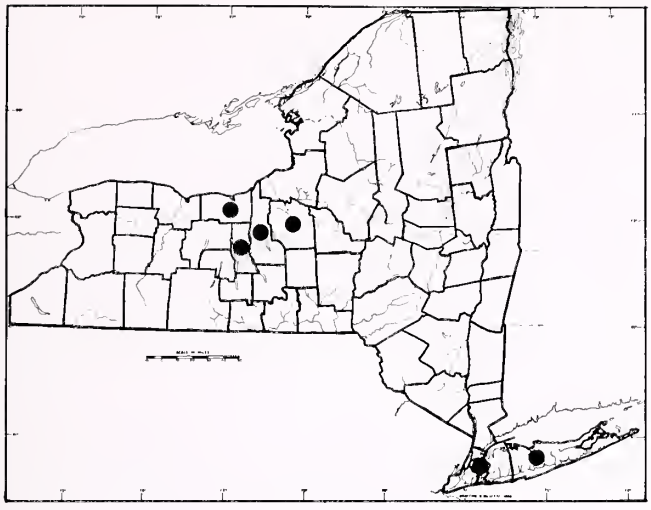
Fruiting: (rarely) May–June

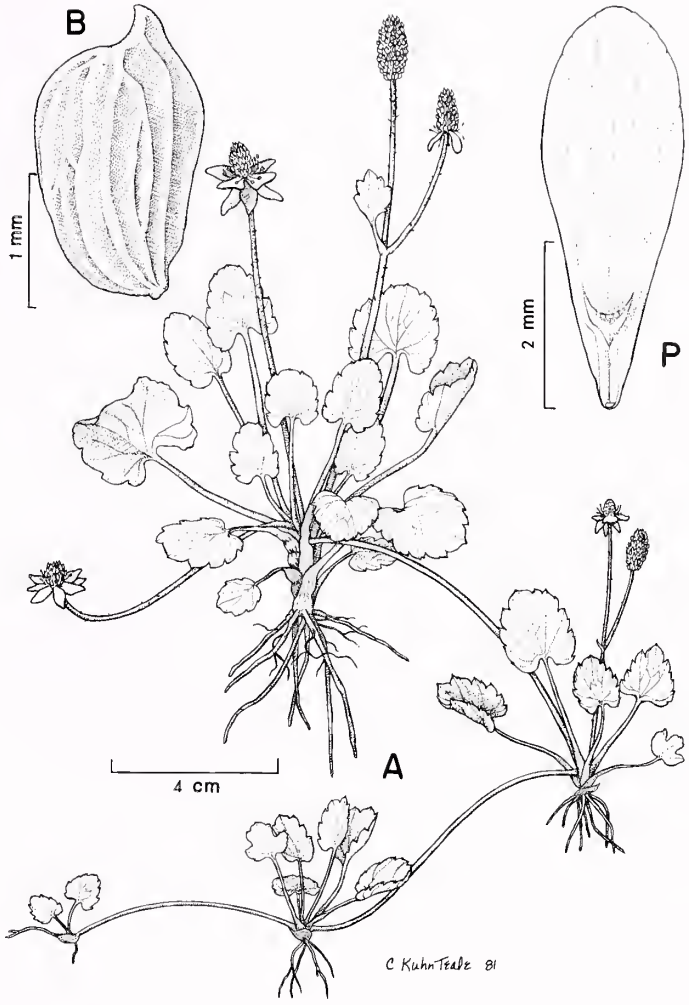
General Distribution: European introduction from Mass. to South Carolina

Description: Plants with **bisexual** flowers; **stigma** one per ovary, sessile and apical; **style lacking; ovaries** 5–44 (72), clustered on a 1–2 mm long, granular, ovoid, **receptacle,** becoming when fertile an ovoid **head of achenes,** ca 2–5 mm in diameter; **achenes** smooth, narrowly obovoid, biconvex, pubescent to glabrous, ca 2.5 mm long, **beakless; stamens** 14–26 (49) hypogynous, 1–4 mm long; **anthers** globose-elliptic; **filaments** linear; **petals** 7–11 (13), yellow (to white), narrowly obovate, 8–15 mm long, 3–7.5 wide; **nectary scales** small, pocket-like, at the petal bases; **sepals** 3 (4), yellow-green, 5–10 mm long, 3–6 mm wide, deciduous, elliptic, glabrous; **flowers solitary** on glabrous **peduncles**; peduncles 1–7 cm long in flower, 3–8 cm in fruit; **cauline leaves** alternate to opposite, similar to **basal leaves**; basal leaves simple, cordate, ovate to deltoid, 1–5 cm broad, with entire to crenate margins; **petioles** 1–15 cm long with sheathing **stipular** bases, often bearing dark, fusiform **bulbils** ca 3 mm long, 1.5 mm broad in the **leaf axils; stems** somewhat succulent, erect or reclining, up to 20 cm long, not rooting at **nodes; roots** of 2 kinds, fibrous and tuberous, the latter fusiform or clavate, up to 5 mm thick. (2n = 16, 24, 32)

Infraspecific Variation: While much variability is evident in Europe, ours are the largely vegetatively reproducing, tetraploid variety *bulbifera*. Pollen is not markedly abortive, but the contents do not stain in aceto-carmine, indicating sterility.

Importance: This species is becoming more and more widespread in wet places, and has become a noxious weed where it crowds out native aquatic vegetation. Like other *Ranunculus* species, it may be poisonous to humans or livestock.





5. *Ranunculus cymbalaria* Pursh

Common Name: Seaside Crowfoot or Buttercup

Type Description: Pursh, Fl. Amer. Sept., vol. 2, p. 392, 1814

Synonyms: *Halerpestes cymbalaria* (Pursh) Greene, *Ranunculus nana* Fisch., *R. saxifragaefolius* Stephen ex Steud., *Oxygraphis cymbalaria* (Pursh) Prantl, *Cyrtorhyncha cymbalaria* (Pursh) Britt., *R. cymbalaria* var. *americana* DC., *R. cymbalaria* forma *hebecaulis* Fern.

Origin: Uncertain, boreal and subarctic

Habitats: Salt marshes, brackish mudflats, shallows and ditches

Habit: Low growing, stoloniferous, palustrine perennials

Flowering: June–August

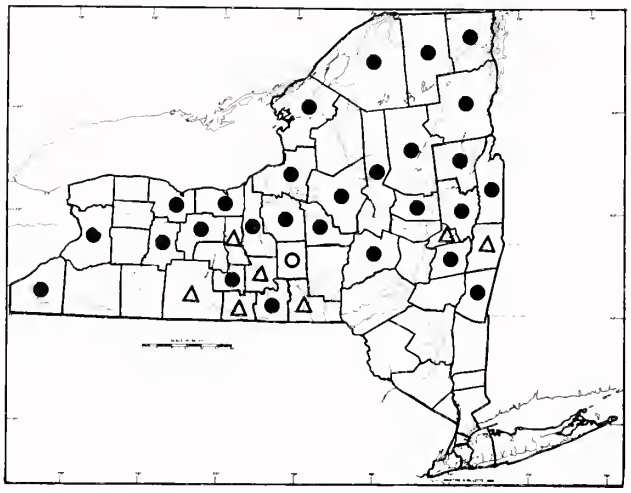
Fruiting: June–August

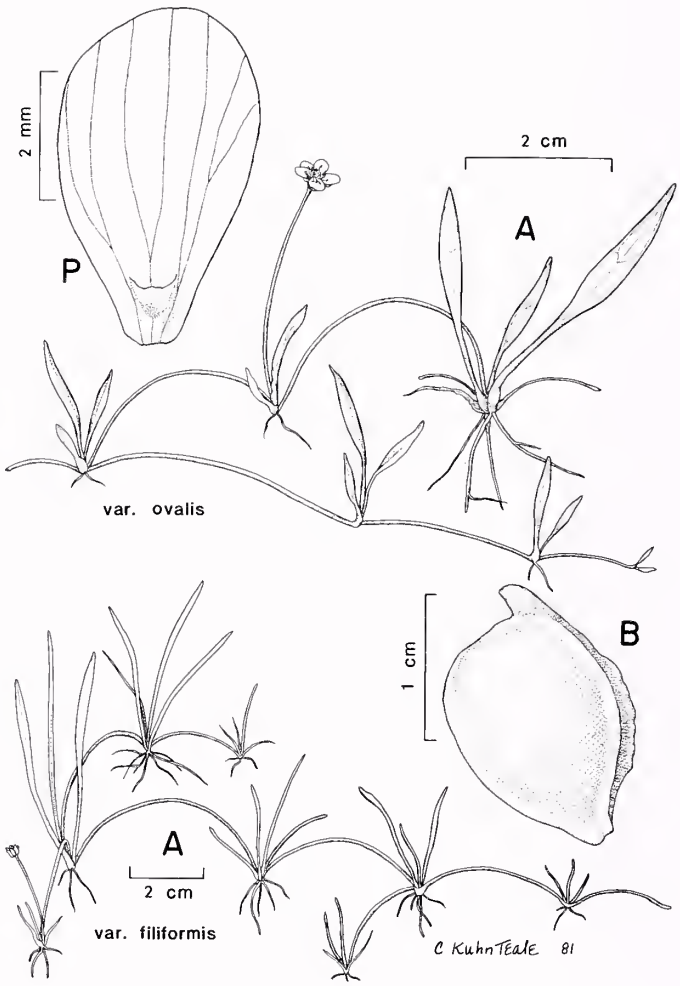
General Distribution: Newfoundland to New Jersey and Minnesota; widespread in western North America (var. *saximontana* Fern.) and also found in South America and Asia; introduced in Europe.

Description: Plants with **bisexual** flowers; **stigma** one per ovary, minute, apical; **style** 1 per ovary, ca 1 mm long, adaxially oriented, persistent; **ovaries** numerous (up to 200), clustered on a sparsely pubescent, cylindrical **receptacle,** becoming a cylindric **head of achenes** up to 13 mm long; **achenes** flattened, with chartaceous **pericarps,** 1.5–2 mm long, obovate to oblong, each face with ± 4 branching veins; **persistent style** (**beak**) eccentric, triangular, 0.25–0.50 mm long, straight or adaxially curved; **seed** often visible, ovoid, ca 0.5 mm long; **stamens** 10–30, about 2 mm long; **anthers** ovate to elliptic; **filaments** slender; **petals** 5 (6–12), yellow, 3–8 mm lng, 1–4 mm wide, obovate to oblanceolate, cuneate or clawed at base, each petal with a pocket-like **nectary scale** near the base; nectary scale with adnate lateral margins and a shallowly to deeply obcordate apex; **sepals** 5, greenish-yellow, cucullate, ovate to elliptic, (2) 3–5 mm long, spreading, deciduous; **inflorescence** irregularly cymose or scapose, of 1–6 flowers which are solitary on elongating **pedicels**; pedicels 0.5–3.0 cm long in flower, up to 6 cm long in fruit, sparsely pubescent, striate, subtended by narrowly oblong **leaves; basal leaves** 4–20 mm long, 4–14 mm wide, ovate to reniform with crenate margins and cordate to truncate bases (**first leaves** at each node often merely 3-lobed as in the northern var. *alpina* Hook.); **petioles** slender, up to 8 cm long in basal leaves, with **stipular bases**; **stems** 1–several, some scapose and erect, 2–15 (30) cm tall, others repent and rooting at **nodes**; **roots** slender, fibrous. (2n = 16)

Infraspecific Variation: Plants transitional to the diminutive var. *alpina* occur in New York State.

Importance: *Ranunculus* species are reported to be poisonous.





6. *Ranunculus reptans* L.

Common Names: Creeping Spearwort, Lesser Spearwort

Type Description: Linnaeus, Species Pl., p. 548, 1753

Synonyms: *Ranunculus flammula* L., *R. filiformis* Michx., *R. flammula* var. *reptans* (L.) Reich., *R. flammula* ssp. *reptans* (L.) Syme, *R. flammula* var. *intermedius* Hooker, *R. reptans* var. *intermedius* (Hook.) T. & G., *R. filiformis* var. *ovalis* Bigel., *R. flammula* var. *ovalis* (Bigel.) Bens., *R. intermedia* Heller, *R. flammula* var. *filiformis* (Michx.) Hook.

Origin: Circumpolar (uncertain)

Habitats: Shores and shallow, fresh water

Habit: Low growing, often stoloniferous perennials

Flowering: June–September

Fruiting: July–October

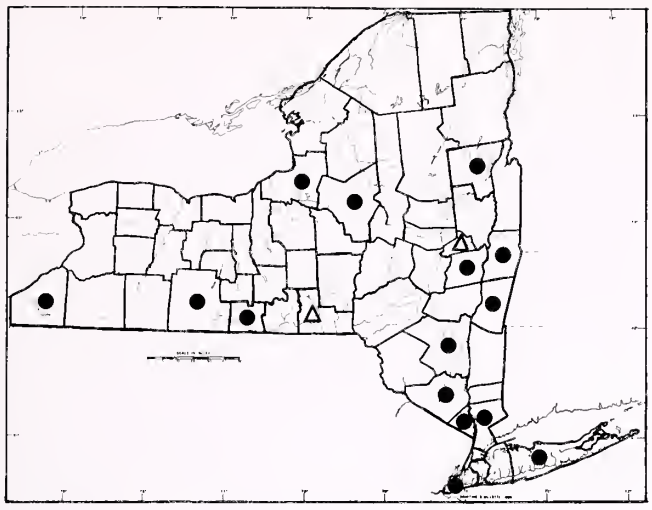
General Distribution: Northern Europe and boreal North America

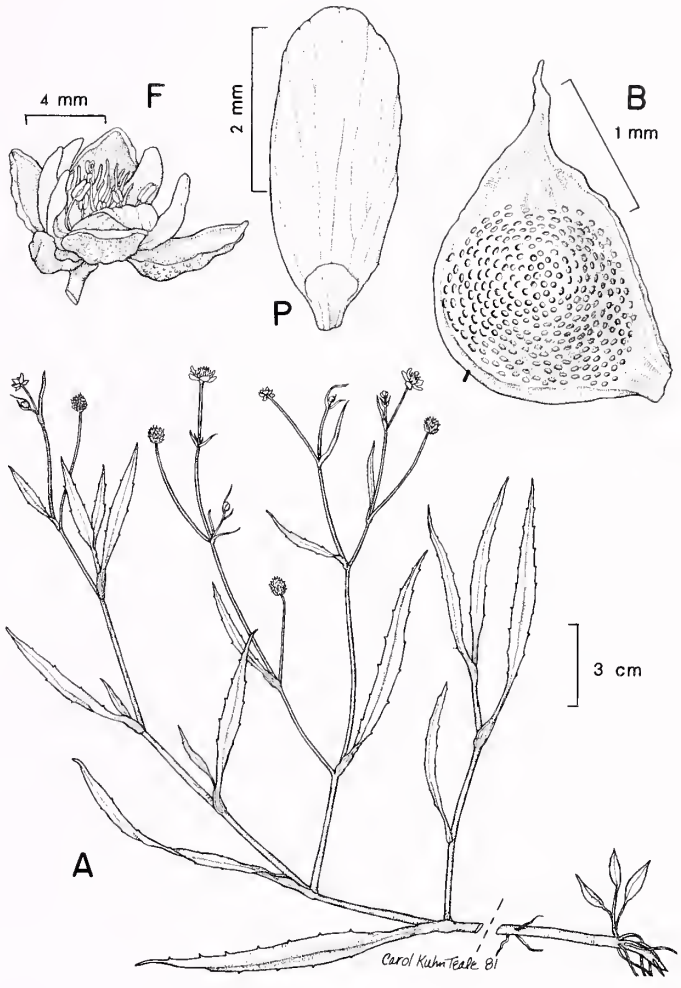
Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, linear-diffuse, minutely hairy, each covering the upper surface of a truncate **style**; **ovaries** 5–25 (50) clustered on a glabrous, granular, ovoid to ellipsoid **receptacle,** becoming a hemispheric, capitate **cluster of achenes**; **achenes** obovate, biconvex, 1–2 (−5) mm long, essentially glabrous, smooth or finely reticulate, margined; **persistent style (beak)** 0.1–0.3 (−1.0) mm long, slightly curved; **stamens** 10–25) (−50), 1–2 mm long; **anthers** elliptic, ca 0.75 mm long; **filaments** slender; **petals** 5 (−11), yellow, glabrous, obovate to oblong, cuneate at base, (2) 4–5 (−8) mm long, 1.5–4.0 (5) mm wide, deciduous, with basal **nectary scales**; nectary scale small, glabrous, pocket-like, wider than long, adnate along lateral margins; **sepals** 5, greenish-yellow, ovate-cucullate, 2–3 (5) mm long, strigose, deciduous; **flowers solitary** or weakly corymbose; **pedicels** 2–10 cm long, sparsely strigose to glabrescent; **leaves** disposed primarily in fascicles of 1–3 (or more), narrowly linear to oblanceolate, elliptic or obovate 0.5–20 mm wide, 10–70 mm long, entire to serrulate, with short, somewhat sheathing **petioles,** or narrower leaves sessile, sheathing at base; **leaf fascicles** subtended by a ± triangular **sheath**; **stems** repeatedly arching, stoloniferous, rooting at the **nodes** with filiform **roots.** (2n = 32)

Infraspecific Variation: The following key accomodates the variation in New York State plants:

1. Basal leaves filiform, linear (cauline leaves may be expanded); achenes 5–15; stems rooting at nearly every node ..... *R. reptans* var. *filiformis* (Michx.) DC.
1. Basal leaves with well developed blades; achenes 10–20 or more; stems rooting only at lower nodes..... .....*R. reptans* var. *ovalis* (Bigel.) Torrey

Importance: Ranunculus species are reported to be poisonous.





7. *Ranunculus ambigens* S. Watson

Common Names: Spearwort, American Spearwort, Water-plantain Spearwort

Type Description: S. Watson, Bibl. Ind. N. Amer. Bot., vol. 1, p. 16, 1879, (also described: Proc. Amer. Acad., vol. 14, p. 289, 1879)

Synonyms: *Ranunculus obtusiusculus* Raf., *R. flammula* var. *major* Hook., R. ambigens var. *obtusiusculus* (Raf.) Davis

Origin: Eastern North America

Habitats: Marshes, wet meadows, ditches, swamps, pond margins

Habit: Sprawling, clump-forming, palustrine to aquatic perennials

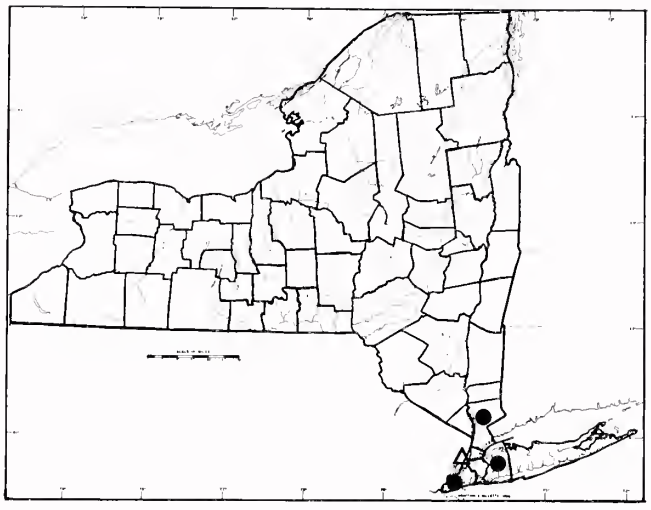
Flowering: June–August

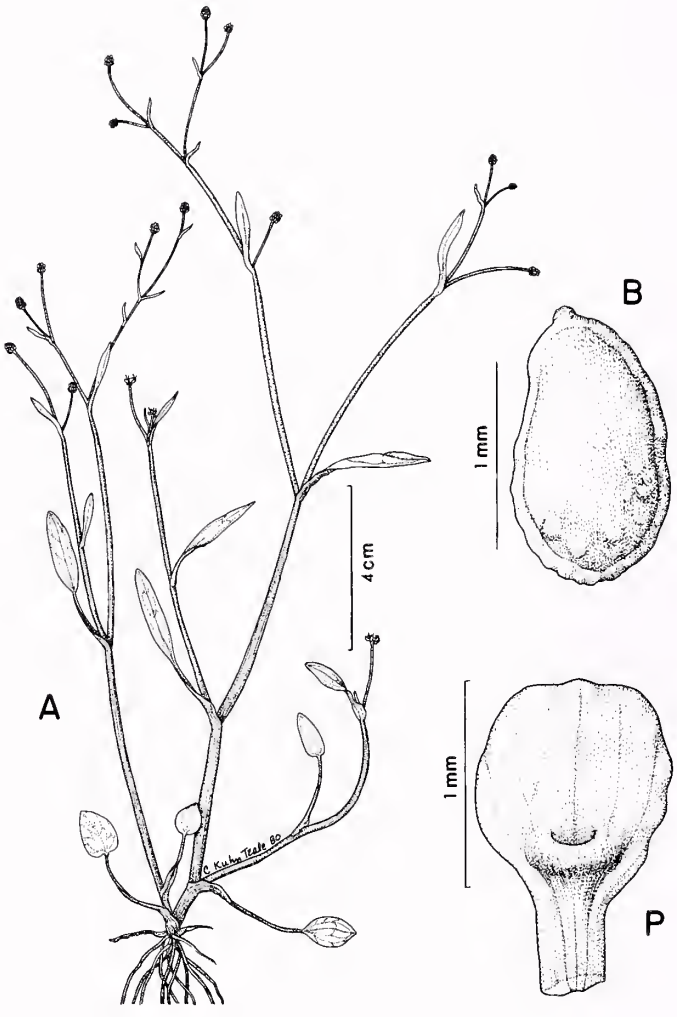
Fruiting: July–August

General Distribution: Maine to Virginia (Georgia) and Louisiana, west to Minnesota

Description: Plants with **bisexual** flowers; **stigma** one per ovary, minute, apical; **style** 1 per ovary, ca 1 mm long, prominent, at a right angle to the ovary, the lower margin thin, the upper margin corky, thickened, the **corky zone** extending down the adaxial margin of the ovary; **ovaries** 30–50 (−90) ca 1 mm long, spirally arranged on a sparsely hispid, narrowly obovate to cylindric **receptacle**, becoming an ovoid **head of achenes** 3–6 mm long; **achenes** obovate-cuneate, ca 2 mm long, weakly biconvex, narrowly to broadly margined, the surfaces spongy-reticulate, glabrous; **persistent style (beak)** horizontally oriented, T-shaped in x-section, ca 1 mm long; **stamens** 30–50, ca 2 mm long; **anthers** short-elliptic; **filaments** slender; **petals** 5–6, yellow, ovate to oblanceolate, glabrous, 4–8 mm long, 1.5–3 mm wide, each petal with a basal **nectary gland** and an associated scale; **nectary scale** variable: apically rounded and laterally free **or** somewhat reduced, apically retuse and laterally mostly fused; **sepals**, 5, yellowish to whitish-green, orbicular-cucullate to ovate, glabrous, ca 4 mm long, 1.5–3 mm wide, deciduous, spreading or tardily reflexed; **flowers solitary** on pedicels in an irregularly cymose **inflorescence**; **pedicels** elongating primarily in bud and flowering stages, 0.5–5 cm long, glabrous, subtended by **reduced leaves**; **leaves** all cauline, lanceolate, 2–12 cm long, 4–30 mm wide, sparsely villous below, minutely serrate, the serrations tipped with **hydathodes**; **petioles** up to 6 cm long, glabrous; **stipular leaf bases** sheathing, up to 2 cm long, often with a few marginal hairs, tapering or auricled; **vegetative stems** up to 2 cm thick, decumbent-stoloniferous, branching and mat-forming, rooting and sprouting at the **nodes**; **flowering stems** erect to ascending, up to 80 cm tall, fistulose, striate, succulent; **roots** mostly adventitious, up to 1 mm thick with slender, fibrous branches.

Importance: *Ranunculus* species are reported to be poisonous.





8. *Ranunculus pusillus* Poir. ex Lam.

Common Name: Spearwort

Type Description: Poiret in Lamarck, Encycl. Meth. vol. 6, p. 99, 1804

Synonyms: *Ranunculus humilis* Pers., *R. oblongifolius* Ell., *R. boiletti* Greene, *R. trachyspermus* Engelm. (in part), *R. pusillus:* (var. *muticus* T. & G., var. *oblongifolius* T. & G., and var. *lindheimeri* Gray)

Origin: North America

Habitats: Swamps, shallow water, seepage areas, seasonally damp soil

Habit: Erect or decumbent, herbaceous annuals

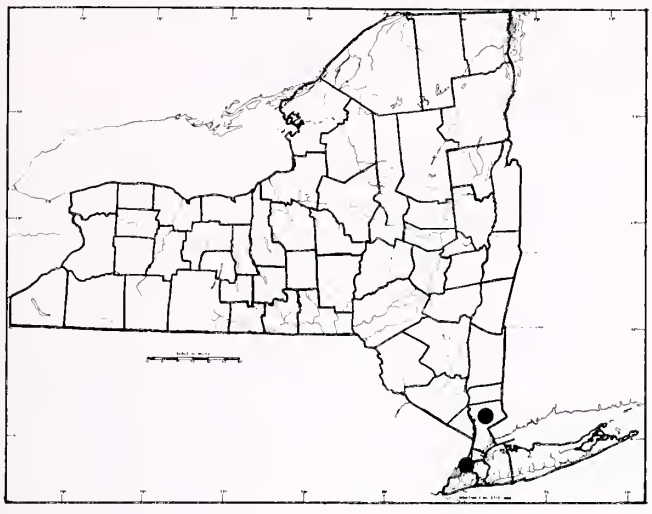
Flowering: April–May

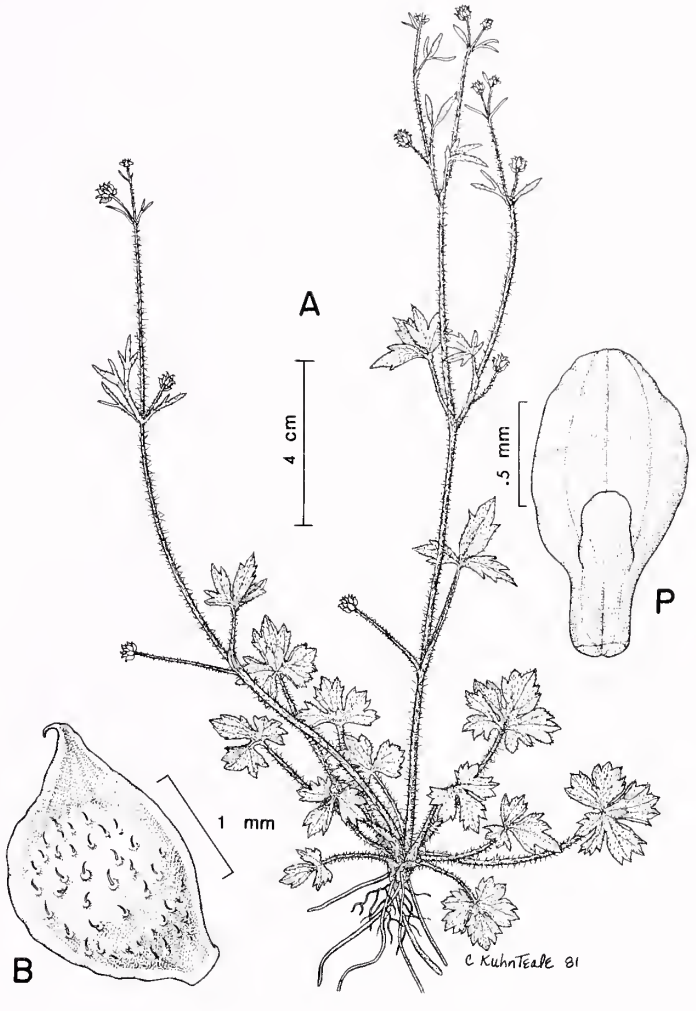
Fruiting: May–June

General Distribution: New York to Florida, west to Indiana and Missouri, (disjunct to California)

Description: Plants with **bisexual** flowers; **stigma** one per ovary, minute, apical; **style** one per ovary, about 1 mm long; **ovaries** 15–50, on a spherical to cylindric or pear-shaped, granular, glabrous **receptacle,** becoming a capitate or hemispheric **head of achenes** ca 4 mm long; **achenes** plump, obovate in outline, ca 1 mm long, slightly margined, faces smooth (to papillate), achene slightly **beaked** with an 0.1–0.2 mm **persistent style**; **stamens** 5–10, ca 1.5 mm long; **anthers** elliptic; **filaments** slender; **petals** 1–3, yellow, obovate, 1–1.5 mm long, with a small **nectary scale** at the base; **nectary scale** pocket-like, ca 0.2 mm long, the apex truncate or emarginate; **sepals** 5, ovate, not reflexed, deciduous, greenish yellow to whitish equaling or slightly exceeding the petals, glabrous or with a few scattered hairs, 1–2 mm long, 0.8–1.0 mm wide; **inflorescence** obscurely cymose, each **flowers** solitary on an elongating **pedicel**; pedicel 1–15 mm long in flower, up to 6 cm long in fruit, subtended by a linear to lanceolate (oblanceolate) **bract**; bracts barely petiolate with dilated, ciliate, stipule-like bases; **upper cauline leaves** similar to bracts, but larger and more prominently petiolate, their margins occasionally showing dentations; **lower cauline** and **basal leaves** simple, ovate to oblong, up to 5 cm long, 1.7 cm wide, margin sometimes shallowly dentate, apex acute to rounded, the base rounded to subcordate; **petioles** 1–6 cm long excluding the **stipular bases** (up to 1 cm long) which are sheathing and sometimes hairy; **stems** multiple, from the base, hollow, somewhat succulent, freely branching above, erect or decumbent, sometimes adventitiously rooting at **lower nodes**; **roots** filiform.

Importance: *Ranunculus* species are reported to be poisonous.





9. ***Ranunculus parviflorus* L.**

Common Name: Small-flowered Crowfoot

Type Description: Linnaeus, Species Pl., ed. 2, vol. 1, p. 780, 1762

Synonyms: *Ranunculus trachysperma* Ell., *R. parviflorus* var. *dimidiatus* Krause

Origin: Mediterranian Europe

Habitats: Waste ground, disturbed, often moist soil

Habit: Rosette-forming, terrestrial, winter annuals

Flowering: April–May

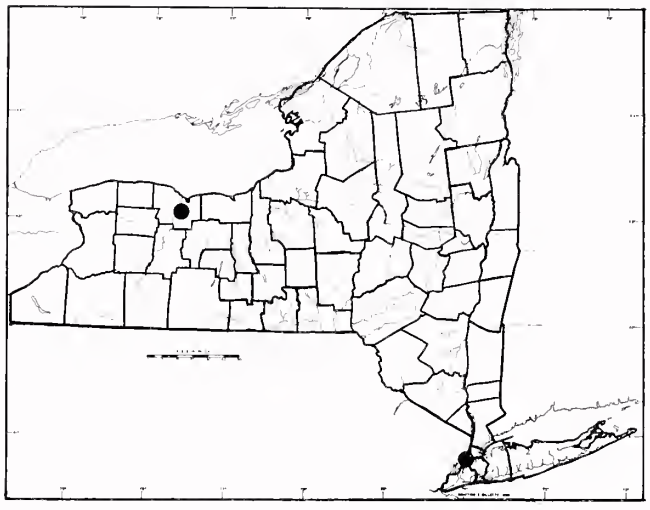
Fruiting: April–May (June)

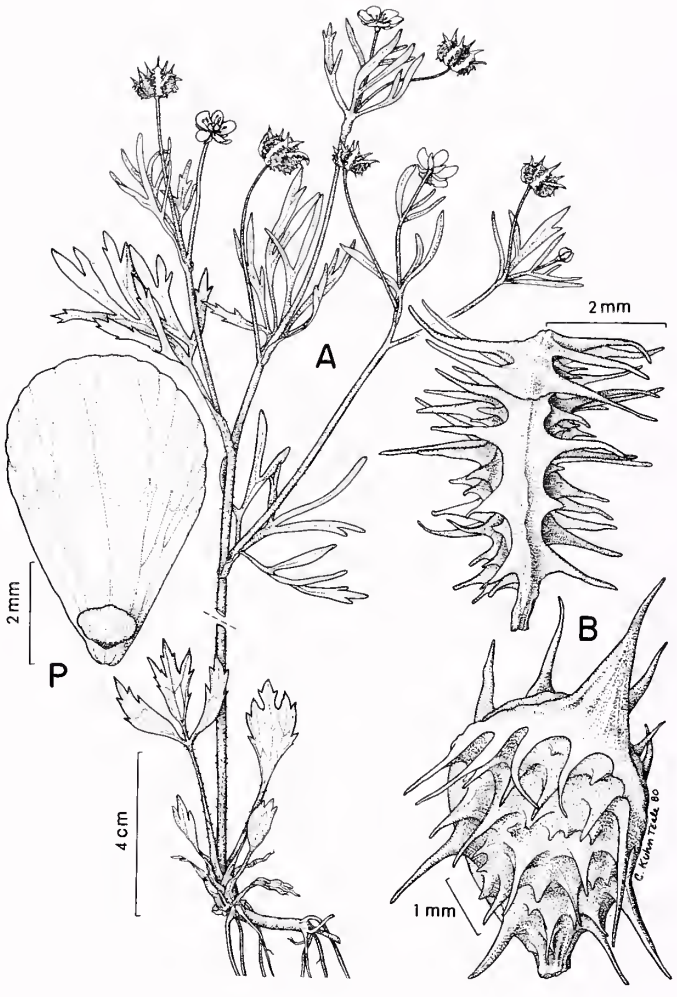
General Distribution: European introduction, usually persisting only in Mediterranian or other warm climates (s. e. United States, California, New Zealand etc.)

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, apical or linear on the terminal adaxial portion of the striaght or recurved, pellucid apex of the conical **style**; style 1 per ovary, ca 0.5 mm long; **ovaries** (5–) 9–15 (–18), clustered on a glabrous but granular **receptacle** ca 1 mm long which expands little in fruit, becoming a capitate **head of achenes**; **achenes** flattened, obovate in outline, ca 1.5 mm long, 1 mm wide, margins greenish, faces brownish to pale tan, papillate, the papillae often reddish, bearing curved or hooked, bristle-like hairs; **persistent style (beak)** deltoid, outwardly curving, ca 0.5 mm long; **stamens** usually 4–6 (1–8) ca 2 mm long; **anthers** elliptic; **filaments** slender; **petals** (0–) 2–3 (–5), glossy yellow, clawed at bases, oval or elliptic (occasionally lobed at apex) usually 3–4 mm long, ca 2 mm wide, each bearing an ovate or obcordate **nectary scale** at the summit of the **claw**; **sepals** 5, greenish-yellow, usually narrowly elliptic or narrowly ovate (sometimes green, leaf-like, lobed or with sheathing bases) not reflexed, densely pubescent, equaling the petals in size; **flowers** axillary, each on an elongating **pedicel**; pedicels 0.1–2 cm long in flower to 5 cm in fruit, densely pubescent; **bracts** usually lanceolate, petioled, 8–15 mm long, occasionally ternate; **cauline leaves** ternate with linear segments or smaller, but similar to the **basal leaves**; basal leaves in a rosette, simple, reniform, 15–20 mm long, 20–25 mm wide, shallowly or deeply 3-lobed, pubescent, margins crenate to acutely toothed; **petioles** 2–12 cm long, pubescent, with expanded, stipule-like bases; **stems** up to 30 cm tall, branched, erect or decumbent (not rooting at nodes); **roots** slender, fibrous.

Note: This species is not likely to persist in New York State. Reports of its occurrence are undoubtedly due to repeated introductions.

Importance: *Ranunculus* species are reported to be poisonous.





10. Ranunculus arvensis **L.**

Common Names: Corn Crowfoot, Hungerweed, Devil's-claws

Type Description: Linnaeus, Species Pl., p. 555, 1753

Origin: Western Europe

Habitats: Waste ground, roadsides, dry woodlands as an escape

Habit: Erect, terrestrial annuals (perennials?)

Flowering: April–May

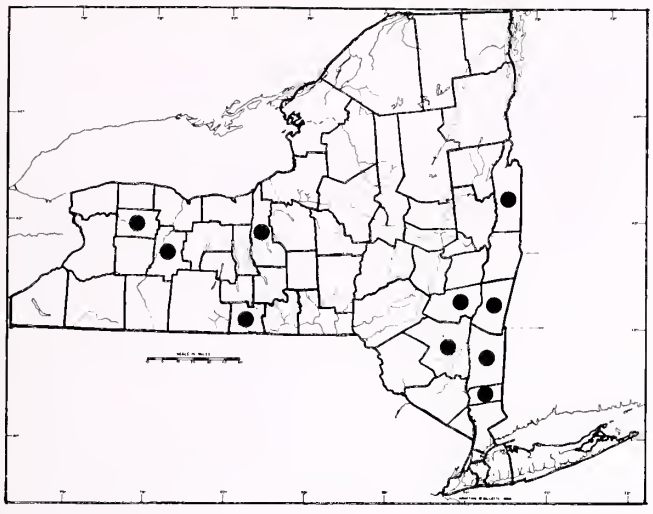
Fruiting: May–June

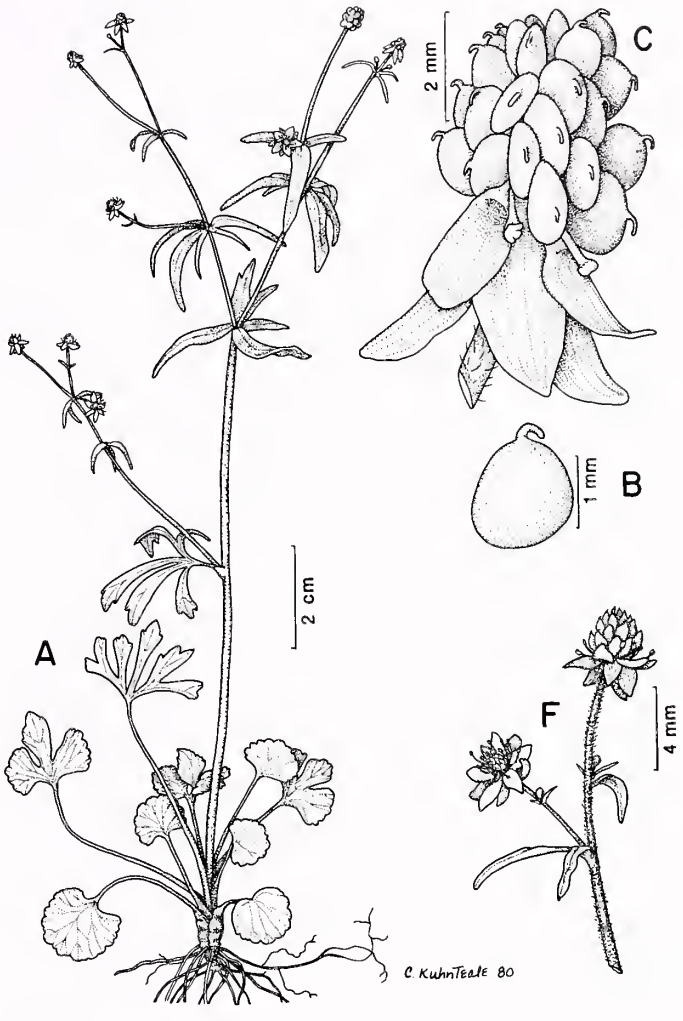
General Distribution: Widely scattered weed in the United States, native to western and central Europe

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, minute, pellucid, apical or narrowly linear on the abaxial tip of the **style;** style 1 per ovary, prominent, narrowly triangular, somewhat laterally compressed, ca 1.5 mm long; **ovaries** (0–) 3–8 (–16) on a short-conic to hemispheric **receptacle,** becoming a globose **head of achenes; achenes** obovate to ovate, flattened, ca 5 mm long (4.5–7.0 mm), conspicuously papillate-spiny, the **spines** stout, with deciduous (or fragile) hooked apices, achene margins rim-like, bearing spines, the achene base slightly stipitate; **persistent style** (**beak**) up to 2.5 mm long, straight, but abaxially eccentric; **stamens** (1–) 4–13 (–18), spiraling, ca 3.5 mm long; **anthers** elongate-elliptic; **filaments** linear; **petals** 0–8,usully 5, ovate to obovate, 4–8 mm long, 2–6 mm wide, yellow, deciduous, with a small, fan-like **nectary scale** at the base of each; **sepals** 0–9, usually 5, yellow-green, elliptic to lanceolate, 3–6 mm long, 1.3–3.5 mm wide, deciduous, pubescent, not reflexed; **flowers solitary** in the axils of cauline leaves; **pedicels** elongating in fruit up to 5 cm, pubescent; **cauline leaves** alternate, ternately or biternately compound, 1–5 cm wide, 1–4 cm long, the leaflets or divisions lanceolate to linear, entire below, often 3-toothed at summit; **basal leaves** simple and apically toothed or deeply 3-lobed with oblanceolate, apically toothed divisions, glabrous or pubescent; **petioles** sparsely pubescent, with somewhat expanded,sheating bases, (petioles) up to 5 cm long below, to almost absent on cauline leaves; **stems** more or less erect, usually not rooting at lower **nodes,** branched, up to 40 cm tall, arising from stout, fibrous **roots.**

Note: This species may not persist for significant periods in New York State.

Importance: *Ranunculus* species are reported to be poisonous.





*11. **Ranunculus allegheniensis*** **Britt.**

Common Names: Allegheny Crowfoot, "Smooth-leaved Crowfoot"

Type Description: Britton, Bull. Torrey Club, vol. 22, p. 234, 1895

Origin: Eastern North America

Habitats: Dry woods, rocky slopes and thickets

Habit: Erect, annual herb (short-lived perennial?)

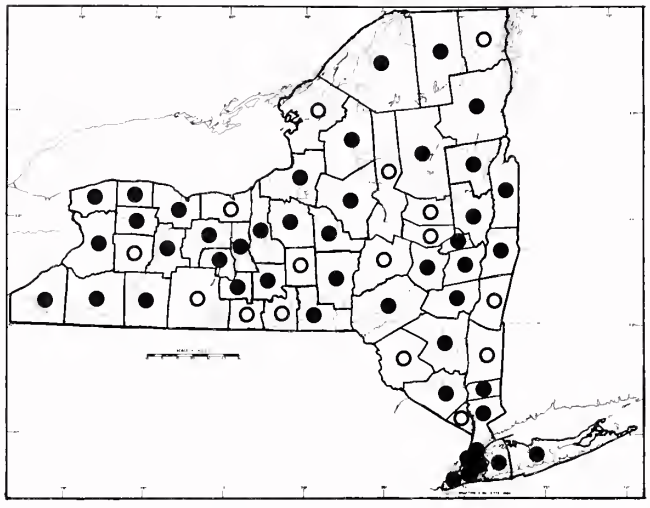
Flowering: May–June

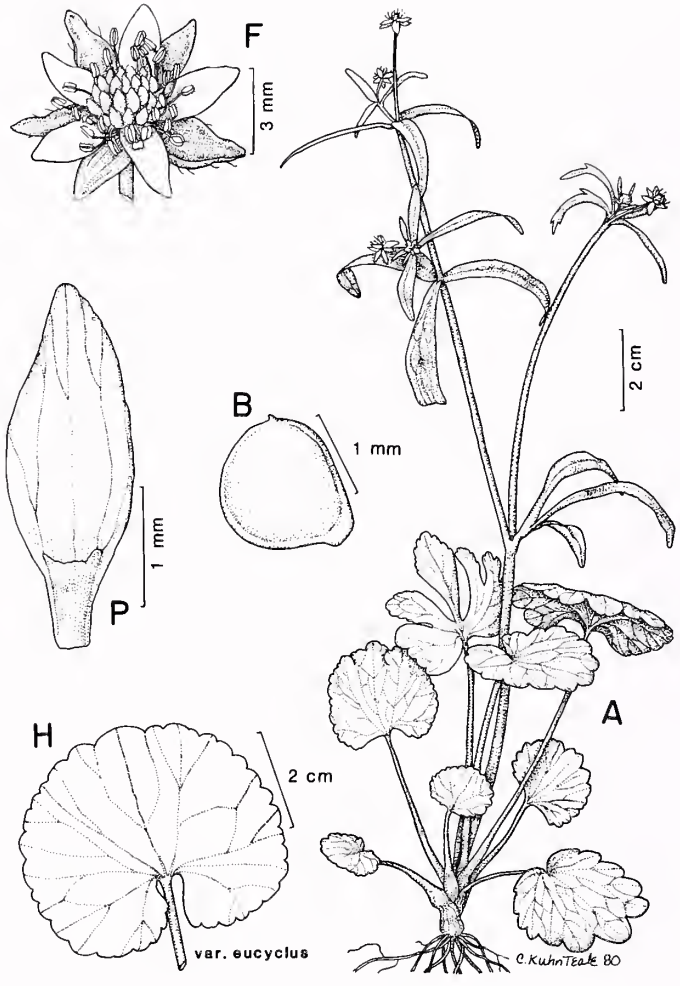
Fruiting: May–July

General Distribution: New England to North Carolina and Tennessee

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary minute, apical; **style** one per ovary, long-tapering, persistent in fruit, about 0.8 mm long and abaxially recurved; **ovaries** up to 50, clustered on a fusiform to narrowly elliptic, sparsely pubescent **receptacle,** becoming a **head of achenes,** up to 4 mm long in fruit; **achenes** orbicular to obovate, biconvex, 1.4–2.0 mm long, weakly margined, with smooth (not shiny) surfaces, **beaked** with the abaxially positioned and strongly abaxially curved **persistent style,** 0.6–1.0 mm long; **stamens** 10–25, hypogynous; **filaments** slender, 1.0–1.3 mm long; **anthers** elliptic, 0.5 mm long, **petals** 5, yellow, deciduous, narrowly obovate, 0.7–1.5 mm long, apex acute glabrous, with a **nectary scale** at base; nectary scale obtriangular with a rounded, often recurved apical lobe, **lateral margins** free or fused; **sepals** 5, ovate, more than twice as long as the petals, 2.0–3.5 mm long, cucullate, greenish-yellow, with pale borders, deciduous, reflexed, pubescent; **flowers** solitary on elongating pedicels in an obscurely cymose **inflorescence; pedicels** often striate, glabrescent, 1–15 mm long in flower, up to 10 cm long in fruit, each subtended by a 3–5 parted, usually sessile,**bracteal leaf** with lanceolate lobes; **cauline leaves** similar to bracts, but usually larger and more petiolate, glabrous or very sparsely pubescent, dichotomously cut and lobed; **basal leaves** mostly simple and reniform in outline, but not uncommonly cut and lobed, and transitional to cauline leaves, margins often crenate, bases shallowly cordate, somewhat succulent, petioled; **petioles** up to 10 cm long on basal leaves, glabrescent or pubescent on the veins of the **sheathing leaf bases; stems** 1–several, branched, striate, somewhat succulent, hollow, up to 7 dm tall, essentially glabrous and glaucous, from a slender **rootstock.**

Importance: *Ranunculus* species are reported to be poisonous.





*12. **Ranunculus abortivus** L.*

Common Names: Kidney-leaved Crowfoot, Smooth-leaved Crowfoot, Chicken-pepper, Small-flowered Crowfoot or Buttercup

Type Description: Linnaeus, Species Pl., p. 551, 1753

Synonyms: *Ranunculus nitidus* Walt., *R. ruderalis* Greene, *R. holmei* Greene, *R. michiganensis* Farw., *R. abortivus* var. *nitidus* (Walt.) D.Don, *R. abortivus* var. *sylvaticus* Laws.

Origin: North America

Habitats: Damp woods, streamsides, partial clearings

Habit: Erect, annual herbs, probably perennial in var. *eucyclus*

Flowering: (April) May–June

Fruiting: May–July

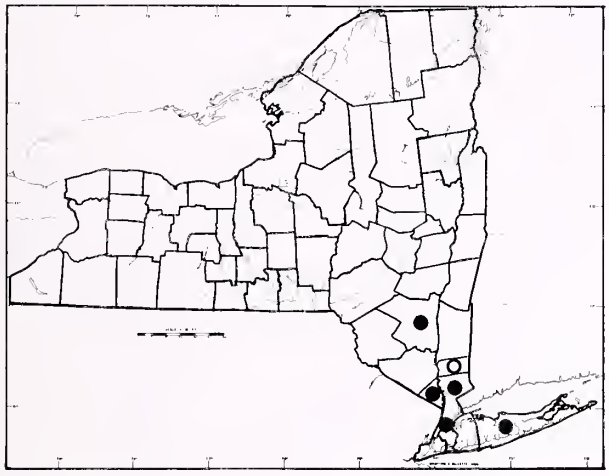
General Distribution: Labrador to Alaska, Washington state, south to Texas and Florida

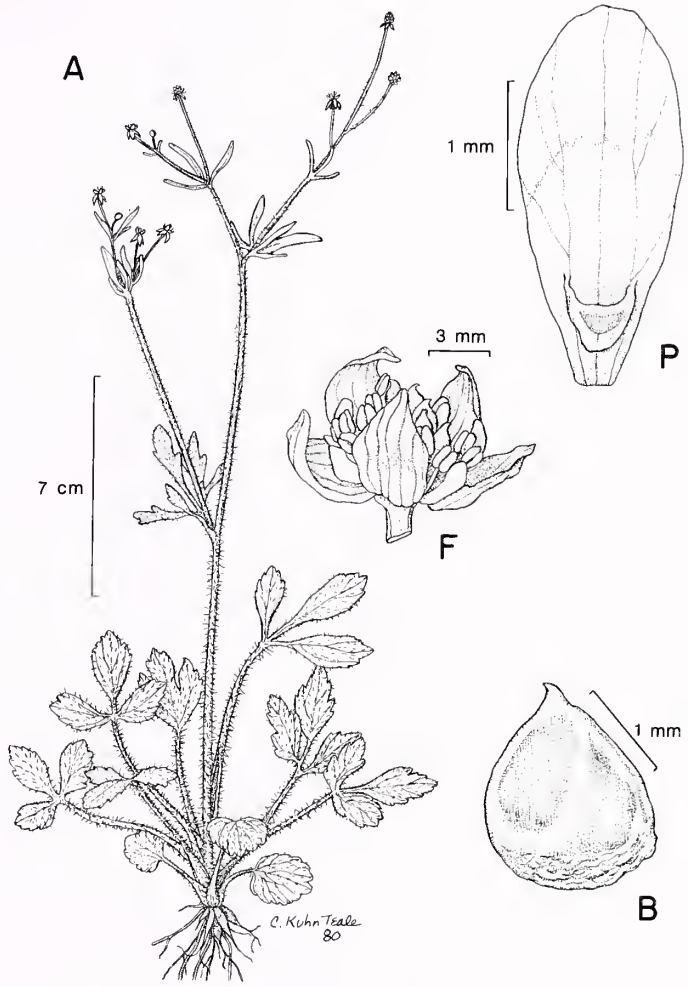
Description: Plants with **bisexual** flowers: **stigma** 1 per ovary minute, apical; **style** one per ovary, triangular, 0.1–0.25 mm long, persistent in fruit; **ovaries** up to 50, clustered on a fusiform to narrowly elliptic, sparsely pubescent **receptacle,** becoming an ovoid **head of achenes** up to 4 mm long in fruit; **achenes** orbicular to obovate, biconvex, (1) 1.3–1.5 mm long, weakly margined, with smooth (not shiny) surfaces, beaked with a straight or curved, eccentrically positioned; **persistent style** 0.1–0.25 mm long; **stamens** 15–30; **anthers** elliptic, about 0.5 mm long; **petals** 5, yellow, dull to glossy, narrowly obovate, 1.5–2.0 (3.5) mm long, glabrous, apex acute or blunt, with a pocket-like **nectary scale** at the petal base; nectary scale obtriangular with a truncate or emarginate apex and adnate lateral margins; **sepals** 5, ovate, cucullate, up to twice as long as the petals, 2–3 (4) mm long, greenish-yellow or purplish-tinged with pale borders, deciduous, tardily reflexed, pubescent; **flowers solitary** on elongating pedicels in an obscurely cymose **inflorescence; pedicels** weakly striate, pubescent or glabrous, 1–15 mm long in flower, up to 10 cm in fruit, subtended by simple and lanceolate or 3–5 parted, sessile or short-petioled **bracteal leaves; lobes,** when present, oblong to lanceolate; **cauline leaves** with linear, dichotomously branching lobes (pseudo-palmate), glabrescent, sessile to short-petioled; **basal leaves** usually simple (or 3-lobed and transitional), glabrescent, reniform to ovoid, 1–7.5 (9) cm in diameter, often slightly succulent, shallowly to deeply cordate at base, margins crenate with the lower margins of the crenations often overlapping; **petioles** (of basal leaves) up to 1 cm long, glabrous or puberulent, with scarious **stipular leaf bases; stems** 1–several, branched, striate, somewhat succulent, hollow, up to 8.5 dm tall, pubescent or glabrous, green; **roots** fibrous, filiform.

Infraspecific Variation: Fernald described variety *eucyclus* with large, markedly circular basal leaves, narrow basal sinuses and slender flexuous stems. Field observations indicate that this variety is probably perennial. Benson's

(1948) circumscription of its distribution was: Quebec to Newfoundland, south to New York State and New England. Fassett (1942) rejected the variety after mass-collection study, but few of his collections were within the range of the variety. We tentatively accept the variety *eucyclus* Fern. until further studies are made. Variety *acrolasius* Fern. includes plants with pubescent upper stems and petioles. This taxon is weak, based on a single character often subject to environmental modification in this genus. Pubescent plants are found mostly in the northern part of the species-range.

Importance: *Ranunculus* species are reported to be poisonous.





***13. Ranunculus micranthus* Nutt. ex T. & G.**

Common Name: Small-flowered Crowfoot

Type Description: Nuttall in Torrey & Gray, Fl. N. Am. 1: 18, 1838

Synonyms: *Ranunculus cymbalistes* Greene, *R. delitescens* Greene, *R. abortivus* L. var. *micranthus* (Nutt.) Gray, *R. micranthus* var. *cymbalistes* (Greene) Fern.

Origin: Eastern North America

Habitats: Rich woods, rocky, shaded areas, especially slopes

Habit: Erect, terrestrial perennials

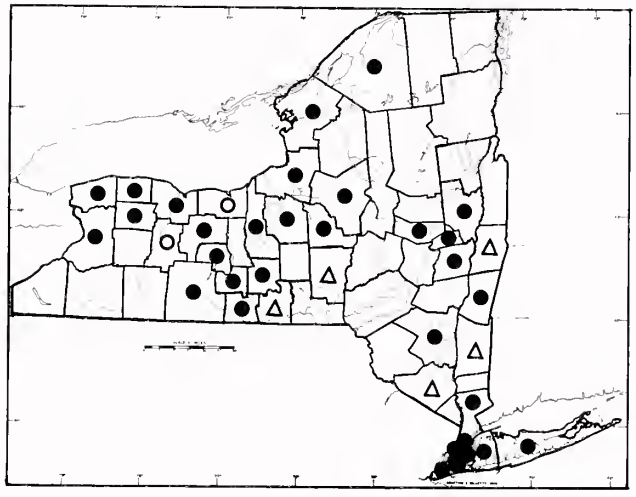
Flowering: May

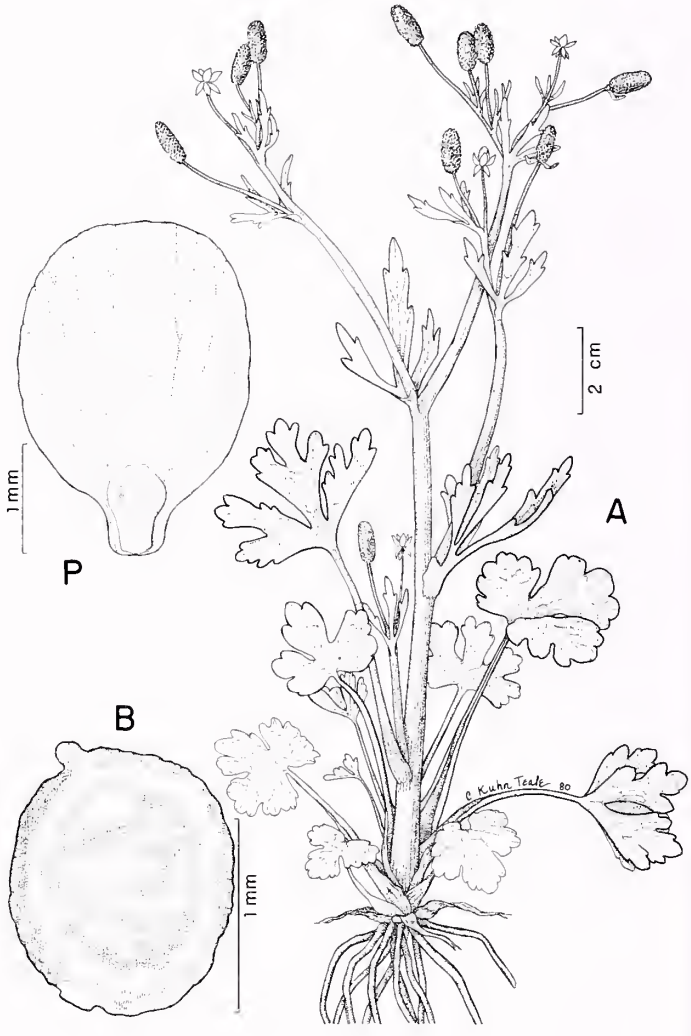
Fruiting: May–June

General Distribution: Massachusetts to North Carolina, west to Oklahoma and South Dakota

Description: Plants with **bisexual** flowers; **stigma** one per ovary, minute, apical; **style** one per ovary, short, pellucid, usually recurved, persistent in fruit; **ovaries** up to 50, clustered on a slender, fusiform **receptacle** which is glabrous (or pubescent only near apex), becoming an ovoid or cylindroid **head of achenes** 3–6 mm long and 2–4 mm wide; **achenes** orbicular to obovate, biconvex, 1.25–1.5 mm long, weakly margined, surface minutely pitted, essentially smooth, each **beaked** with 0.15–0.3 mm long, curved and often hyaline, eccentricly positioned **persistent style; stamens** 15–30, ca 2 mm long; **anthers** elliptic; **petals** 5, yellow, elliptic to obovate, 2–3 (3.5) mm long, 1.0–2.5 mm wide, glabrous, each with a pocket-like **nectary scale** at base; nectary scale obtriangular, with a retuse or obcordate apex; **sepals** 5, yellowish-green to whitish-green, 2.5–3.5 mm long, ovate, reflexed, deciduous, up to 1.5 times as long as the petals, pubescent; **flowers solitary** on elongating pedicels in an obscurely corymbose **inflorescence; pedicels** 2–20 mm long in flower, 15–50 (90) mm long in fruit, sparsely pubescent (to glabrous); **subtending leaves** sessile or short-petioled, simple and linear to narrowly obovate or 3–5 cleft or forked, with linear to narrowly obovate lobes; **cauline leaves** 3–5 cleft, short-petioled, villous, their lobes oblanceolate to

obovate, often twice lobed; **basal leaves** villous, often dimorphic, the simple ones 1–3 cm broad, ovate to nearly circular in outline, bases truncate to cuneate, margins crenate or crenate-lobed and transitional to the compound type of basal leaf; compound basal leaves ternate, usually with stalked, obovate to oblanceolate leaflets which are often apically crenate or lobed, their bases usually cuneate; **petioles** villous, 3–8 cm long on basal leaves with expanded **stipular bases**; **stems** 1 (–8), branched, striate, flexuous (to somewhat succulent), often fistulose, 15–30 (40) cm tall, villous even towards the base; **roots** dimorphic, filiform and fibrous as well as fusiform-thickened.
Infraspecific Variation: In one specimen observed, the nectary scale was associated with an apically rounded, laterally free, petal-like structure ca 1 mm long (perhaps teratological). Fernald (1950) refers northeastern materials to var. *delitescens* (Greene) Fern., a taxonomically doubtful entity.
Importance: *Ranunculus* species are reported to be poisonous.





14. *Ranunculus sceleratus* L. ssp. *sceleratus*

Common Names: Cursed Crowfoot, Celery-leaved Crowfoot, Blisterwort, Ditch Crowfoot

Type Description: Linnaeus, Species Pl., p. 551, 1753

Synonyms: *Ranunculus sceleratus* forma *natans* Gluck; many additional synonyms apply only to the western *R. sceleratus* ssp. *multifidus* (Nutt.) Hultén, which is apparently native North American

Origin: Eurasia

Habitats: Wet soil or shallow water in ditches, swamps, wet woods, on shores and rarely in salt marshes

Habit: Erect, somewhat succulent annuals

Flowering: May–July (rarely later)

Fruiting: May–August (–October)

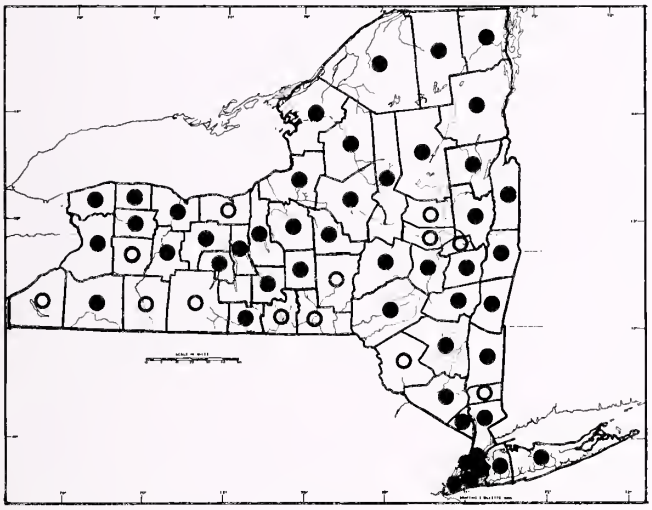
General Distribution: Circumboreal, Eurasia to western and central North America; most authorities consider ssp. *sceleratus* of eastern North America to have been introduced from Europe

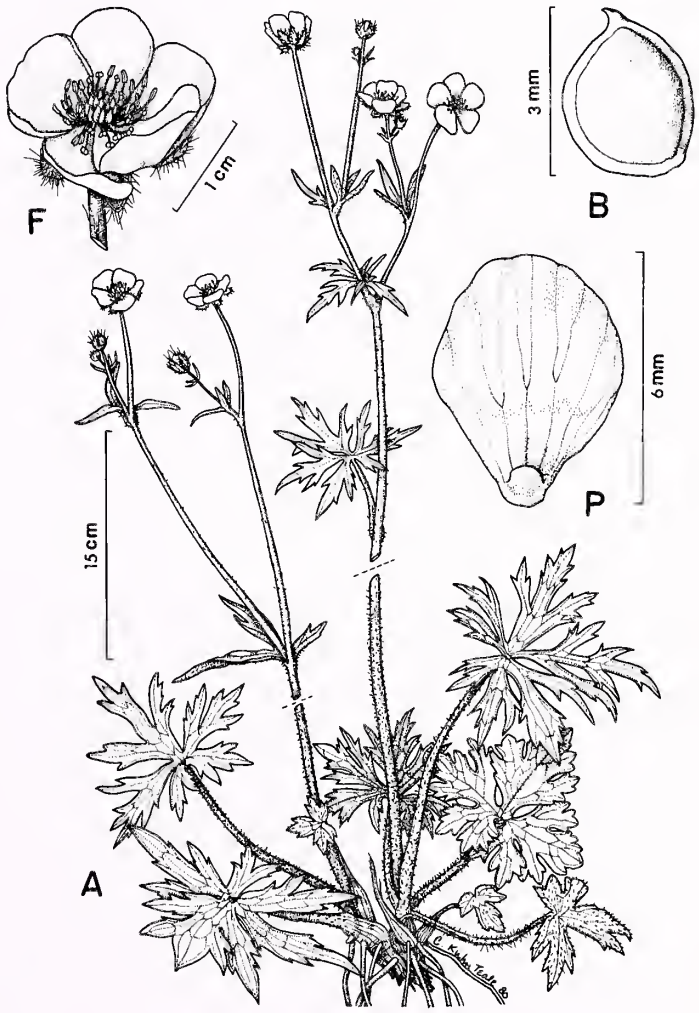
Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, minute; **style** 1 per ovary, straight or recurved, eccentric-apical, ca 0.1 mm long; **ovaries** (50–) 100–300, clustered on a glabrous to pilulose, elliptic to cylindric **receptacle**, becoming a cylindric **head of achenes** 2.5–10 mm long, 3–7 mm thick; **achenes** glabrous, suborbicular to obovate, 0.8–1.4 mm long, minutely **beaked** by the **persistent style**, achenes with corky-pustulose margins and obscurely transversely reticulate central areas; **stamens** 10–25, ca 1.5 mm long; **anthers** short-elliptic; **filaments**

linear; **petals** 5, light yellow, 2–5 mm long, 1.5–3 mm wide, oblong to obovate, often pilose beneath, each with a notched, marginally adnate **nectary scale** ca 1 mm long at its base; **sepals** 5, yellowish to green, spreading, reflexed, or often promptly deciduous, pilose, 2–5 mm long, 1.5–2 mm wide; **peduncles** pilose, 0.5–3.0 cm long, each one bearing a single flower; **upper leaves** subtending peduncles, sessile, oblanceolate to elliptic and entire or resembling cauline leaves just below; **cauline leaves** numerous, somewhat succulent, variable in shape, dissection and petiole length, the upper ones tending to be elliptic or oblanceolate, entire or with rounded, irregular lobing and cuneate bases; **lower cauline leaves** tending to be reniform, but often ternately cleft or lobed, the lobes generally obovate with rounded sinuses and obtuse tips, the larger leaves up to 5 cm long, 6 cm broad; **basal leaves** more or less reniform in outline 0.8–10 cm wide, often with shallow to deep, rounded lobes (submerged plants may produce elongate floating leaves); **petioles** of basal leaves up to 25 cm long; **sheathing bases** 2–10 mm long with **hyaline auricles**; **stems** erect, hollow, often profusely branching, glabrous, slightly furrowed, leathery to somewhat succulent, especially if in contact with water, 1–10 dm tall from fleshy **roots**. (2n = 32)

Infraspecific Variation: Environmental modifications are common in this species, and heterophylly is the general rule. Dry site plants are often depauperate, while inundated plants may have strikingly inflated stems and floating leaves. The latter have been described as forma *natans* Glück.

Importance: *Ranunculus* species are reportedly poisonous.





15. *Ranunculus acris* L.

Common Names: Common Buttercup, Tall Buttercup, Field Buttercup, Goldiecup, Blister-weed

Type Description: Linnaeus, Species Pl. p. 554, 1753

Synonyms: *Ranunculus acer* L., *R. boreanus* Jordon (of N.Y. reports), *R. acris* var. *latisectus* G. Beck, *R. acris* var. *steveni* (And. ex Bess.) Lange

Origin: Europe

Habitats: Open, sunny places from sea level to alpine summits, typically pastures, meadows, fields, roadsides, lawns etc.

Habit: Erect (to spreading) herbaceous, terrestrial perennials

Flowering: May–Sept.

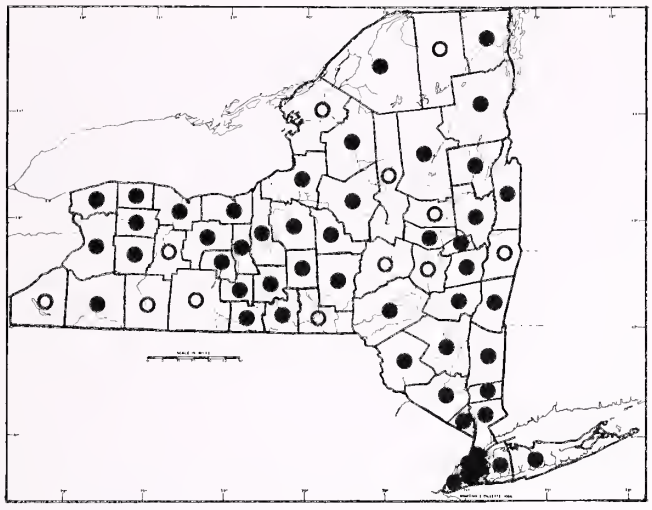
Fruiting: May–Sept. (October)

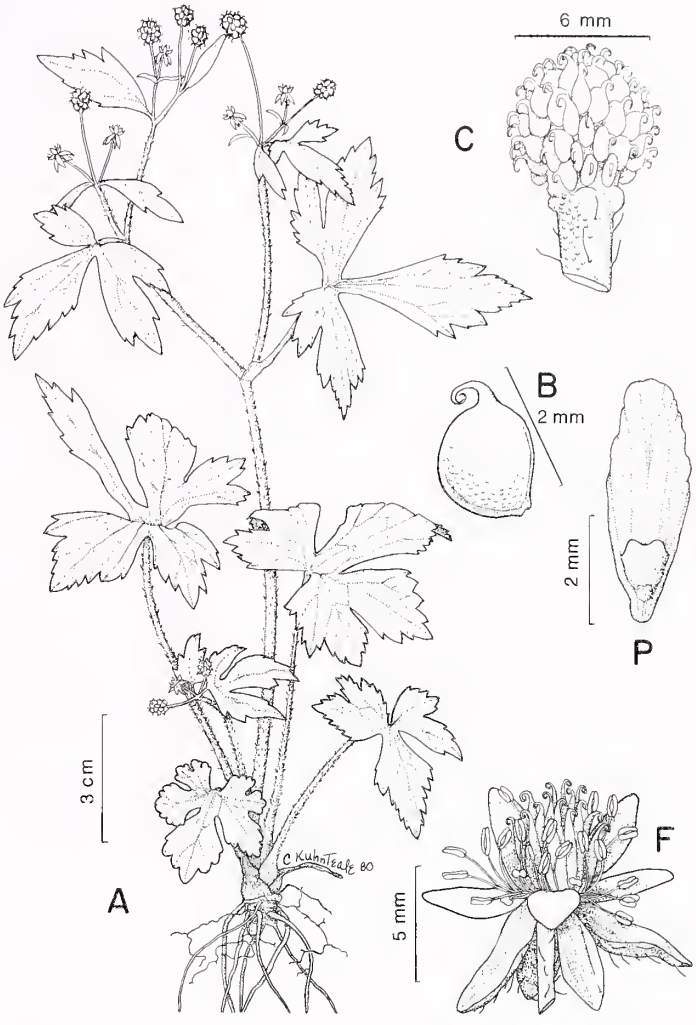
General Distribution: A common weed worldwide in boreal and temperate zones

Description: Plants usually with **bisexual** flowers; **stigma** 1 per ovary, diffuse and covering the upper surface **of the** recurved style, the **stigmatic surface** usually distinguishable in fruit; **style** 1 per ovary, short, apical, but **adaxially** eccentric and adaxially recurved, persistent in fruit; **ovaries** (14) 25–40 (–83), clustered on a glabrous, pear-**shaped receptacle,** becoming a globose **head of achenes** 4–7 mm long and 4–8 mm wide; **achenes** obliquely obovate, more or less flattened, 2–3 mm long, 1.8–2.5 mm wide, margined, surface dull and brown when ripe; **persistent style (beak)** outwardly curved, deltoid, 0.2–0.6 mm long; **stamens** 40–160, up to 4 mm long; **anthers** elliptic; **filaments** linear; **petals** 5 (–13), chrome yellow (to white), glossy, obovate, cuneate at base, 5–11 (–15) mm long, 4–10 (–14) mm wide, deciduous, each petal with a basal **nectary scale**; nectary scale obovate, ca 1 mm long, attached at its base and lower ¼ of sides; **sepals** 5 (–13), ovate, shorter than the petals, greenish, spreading, more or less adpressed to the petals (not reflexed), with long hairs on undersurfaces, deciduous; **flowers** solitary on elongating pedicels forming an obscurely cymose **inflorescence,** the early flowers usually larger; **pedicels** pubescent, 1–5 cm long in flower, 4–12 cm long in fruit; **subtending leaves** with linear lobes, ternate to 5 parted; other **cauline leaves** alternate, petioled, similar in form, but smaller than the leaves of the **basal rosette**; **basal leaves** usually pentagonal in outline, palmately cleft with (2) 3 (–7) short-petiolate or sessile major divisions, the terminal division usually ternately or biternately lobed and toothed, lateral divisions primarily 2-lobed with 2- or 3-cut tertiary lobes; lobes are cuneate at base; **leaves** generally 4–8 cm long, 5–10 cm wide, densely pubescent with appressed hairs on lower surfaces, less hairy above; **petioles** (0.1) 5–20 cm long, varying from densely pubescent to glabrous, bases of petioles sheathing, 3–5 cm long; **stems** 1–several, erect, freely branching above the lower ⅓ of plant, fistulose towards the base, pubescent, 15–110 cm tall, arising from an erect (to creeping) sympodial, dark brown to black **rhizome**; rhizome more or less persistent, but usually shortened by rotting and shrouded with persistent fibers from leaf bases of previous years; **roots** tough, fibrous. (2n = 14, 28, 29, 32 and 18 in gynodioecious plants)

Infraspecific Variation: Several subspecies are recognized in Europe, based on characters of the rhizome, leaf dissection, hairs and phyllotaxis (see S. M. Coles, *Watsonia* 8: 237–261). New York specimens with elongate rhizomes and less dissected, wide-segmented leaves have the spiral phyllotaxis of ssp. *acris* rather than the distichous type of ssp. *friesianus* (Jord.) Rouy & Fouc. Plants previously reported as var. *steveni* (And. ex Bess.) Lange and var. *latisectus* G. Beck may be referred to *R. acris* ssp. *acris* var. *villosus* (Drab.) S. M. Cole, The common cultivar "Flore Pleno" has twice been encountered as in a non-garden situation in New York State. Abberent individuals may be found with hairs on petals or fruits.

Importance: Although not extremely popular, plants with more than five-petaled flowers are cultivated. The plants are poisonous and have been implicated in livestock poisoning and illness.





16. ***Ranunculus recurvatus*** **Poir. ex Lam.**

Common Names: Hooked Buttercup, Rough Buttercup

Type Description: Poiret in Lamarck, Encyc. Met., vol. 6, p. 125, 1804

Synonyms: *Ranunculus hirsutus* Muhl., *R. sanicu-laeformis* Muhl., *R. recurvatus* var. *adpressipilus* Weath., *R. recurvatus* var. *laevicaulis* Hager ex Weath., *R. recurvatus* forma *hageri* Weath. ex Peattie

Origin: Temperate, Eastern North America

Habitats: Wet to dry woods, streamsides, slopes, ravines

Habit: Erect to ascending, non-stoloniferous terrestrial or palustrine perennials

Flowering: (April) May–June

Fruiting: May–June (early July)

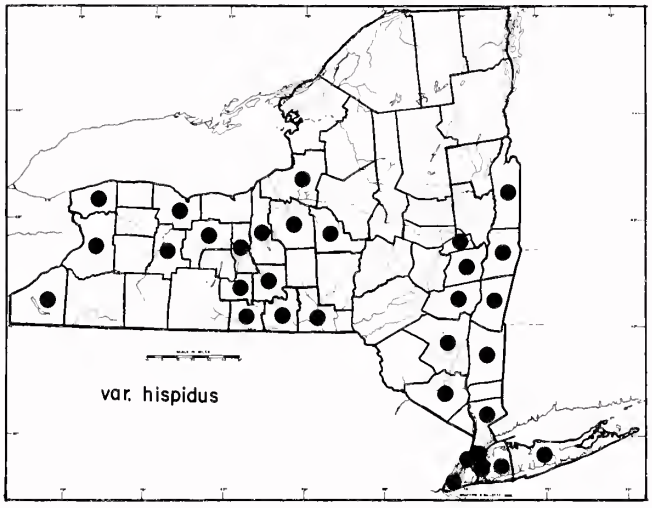
General Distribution: Newfoundland to Florida, west to North Dakota and Texas

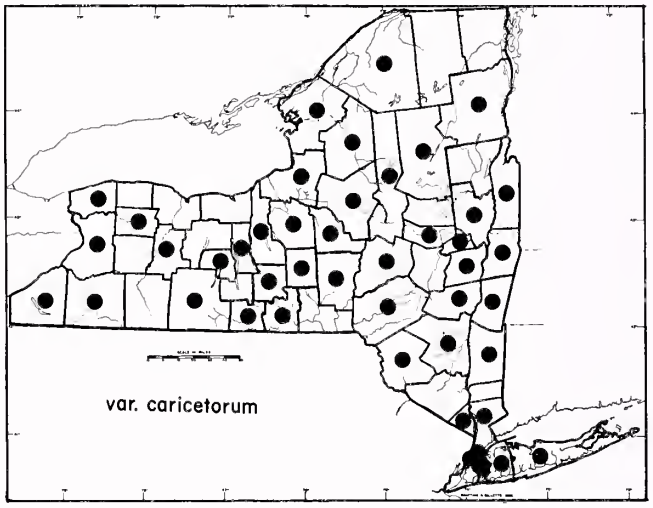
Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, minute, apical ± craterform; **style** 1 per ovary, strongly recurved-uncinate, persistent in fruit, minutely papillate on lower adaxial side; **ovaries** 10–40, clustered on a clavate **receptacle** whose upper portion is granular, pustulose and hispid, becoming a globose **head of achenes**, 5–7 mm long, 4–6 mm wide; **achenes** suborbicular to weakly obovate, flattened, 1.5–2 mm long, ca 1.5 mm wide, somewhat margined, surfaces minutely pitted; **persistent style (beak)** prominent, 1–1.5 mm long, strongly adaxially recurved or ± coiled; **stamens** 10–25, about 4 mm long; **anthers** elliptic or linear; **filaments** slender or transitional to petals; **petals** usually 5, 2.0–6 mm long, 2–3 mm wide, narrowly elliptic to obovate, yellow, cuneate at bases (sometimes clawed in petals transitional to stamens) each with a prominent obdeltoid **nectary scale** at base, nectary scale adnate at sides, forming a pocket with a short, rounded, free portion or with 2 small, free, terminal flap-like lobes (nectary scales of transitional petals narrower with longer free portions); **sepals** 5, greenish, reflexed from near point of insertion, broadly lanceolate, 4–8 mm long, 2–3 mm wide, generally longer than the petals, apices acute, lower surfaces pubescent; **flowers** borne singly on elongating peduncles in a few-flowered corymbose **inflorescence**; **peduncles** pubescent, weakly sulcate, 1–8 mm long in flower, up to 5 cm long in fruit; **subtending leaves** smaller than other cauline leaves, lanceolate or 3-lobed, **cauline leaves** usually 5–9 cm long, 6–12 cm wide, depressed ovate-cordate to shallowingly triangular in outline, shallowly to deeply 3-lobed, lateral lobes often 2-parted, lobe margins crenate or dentate, surfaces glabrous to pubescent; **basal leaves** usually smaller than median

cauline leaves, but similar in shape and dissection; **petioles** 1–17 cm long, glabrous or pubescent; **stem** usually solitary, occasionally branched above, the lowest internode characteristically the longest; **internodes** fistulose, pubescent (to glabrous) erect or ascending, up to 50 cm tall, arising from a small **corm-like base** with fibrous **roots.**

Infraspecific Variation: Varieties and forms have been described, based on the nature of the pubescence. Intermediates are frequent in New York. As with *R. repens* and *R. hispidus* optimum growing conditions may produce unusually large plants.

Importance: *Ranunculas* species are reportedly poisonous.





17. *Ranunculus hispidus* Michx.

Common Names: Hispid Buttercup (var. *hispidus*), Swamp Buttercup, Northern Swamp Buttercup, Marsh Buttercup, "Early Buttercup" (var. *caricetorum*), Swamp Buttercup (var. *nitidus*)

Type Description: Michaux, Fl. Bor. Amer. I., p. 321, 1803

Origin: Eastern North America

Synonyms: *Ranunculus septentrionalis* Poir, *R. marylandicus* Poir. (see also under varieties)

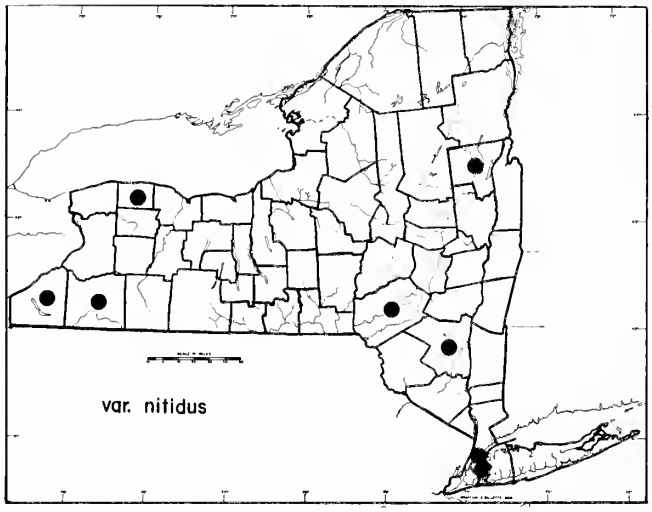
Habitats: Dry to wet woods, clearings, swamps and marshes (see under varieties)

Habit: Erect, repent or stoloniferous, herbaceous perennials

Flowering: April–June

Fruiting: May–June

General Distribution: Eastern United States and adjacent Canada, west to Manitoba, Kansas and Texas



Description: Plants with **bisexual** flowers; **stigma** one per ovary, minute, apical, usually deciduous in fruit; **style** one per ovary conspicuous, 1–3 mm long, somewhat eccentric, usually straight, tapered from a stout base to a slender tip, persistent; **ovaries** 15–40 (–60), clustered on a glabrous to hispidulous, clavate to cylindroid **receptacle** 2–3 mm long in flower, becoming a globose to ovoid **head of achenes** which is 4–12 mm long, 5–10 mm wide; **achenes** weakly biconvex or somewhat flattened, 3–4.5 mm long, 2–2.5 mm wide; obliquely obovate with one shallowly curved and one deeply curved side, narrowly or widely margined, surface glabrous, essentially smooth, but granular under high magnification, dark brown at maturity; **persistent style (beak)** (1–) 2–3 mm long at maturity; **stamens** 25–70, about 4 mm long, spirally disposed; **anthers** elliptic; **filaments** slender; **petals** 5–8 (–10), yellow, glossy, 6–16 mm long, 3–13 mm wide; narrowly to broadly obovate (orbicular), narrowed at bases, deciduous, each petal with a basal **nectary** covered by a scale; **nectary scale** narrowly to broadly obovate with a rounded (to truncate) tip, free and flap-like except at base; **sepals** 5, deciduous, yellowish-green to whitish-green, spreading or reflexed, cucullate, 3–10 mm long, 2–5 mm wide, pubescent on lower surfaces; **inflorescence** irregularly cymose, few-flowered, the flowers born singly on elongating **pedicels**; pedicels pubescent, sulcate, 1.5–6.0 cm long in flower, up to 20 cm long in fruit, each subtended by an **involucral leaf**; involucral leaf varying from lanceolate to ternately compound, the margins entire or dentate; **cauline leaves** alternate, similar to **basal leaves**; basal leaves ternately lobed or compound, ovate-cordate to deltoid in outline, 2–15 cm long, 3–15 (–20) cm wide, when compound the **leaflets** petiolulate, the terminal **petiolule** longer than the lateral ones (up to 3 cm long); **terminal leaflet** 3-lobed, laterals 2-lobed, margins strongly dentate, with **hydathodes**, leaflet bases narrowly to widely cuneate or subcordate; **petioles** 2–30 cm long, sparsely to densely pubescent with expanded and somewhat clasping **stipular bases** (1–9 cm long) with tapered, truncate or round-auricled apices; **stems** erect or ascending to sprawling-repent or **stoloniferous** 15–90 cm long, densely pubescent to nearly glabrous, arising from a short vertical **caudex** and **rootstock** part of which disintergrates (premorse) each year; **roots** fleshy, cord-like or fibrous. (2n = 32, 64 in var. *caricetorum*)

Infraspecific Variation: The taxonomic history of the *Ranunculus hispidus* complex has been a long and confused one. Each variety of *R. hispidus* (as treated here) has been recognized at the species level. Early confusion by American botanists concerning the distictness of native materials from *R. repens* has confounded the problem. We have treated some of these problems under the varieties.

KEY TO VARIETIES

1. Plants repent or stoloniferous ..... (3)
1. Plants erect (not repent or stoloniferous) ..... (2)
   2. Sepals spreading, not reflexed, margins of achenes narrow (dry habitats) ..... 17a. *R. hispidus* var. *hispidus* (p.)
   2. Sepals reflexed, margins of achenes broad (habitat wet or seasonally moist) ..... 17c. *R. hispidus* var. *nitidus* (p.)
3. Achenes with narrow margins; sepals spreading, not reflexed .... 17b. *R. hispidus* var. *caricetorum* (p.)
3. Achenes with broad margins; sepals reflexed ..... 17c. *R. hispidus* var. *nitidus* (p.)

17a. *R. hispidus* var. *hispidus*

Synonyms: *Ranunculus marylandicus* Poir., *R. cardiopetalus* Greene, *R. octopetalus* Greene, *R. belvisii* DC., *R. trifoliatus* Muhl. ex Schlect., *R. hispidus* var. *typicus* Benson, *R. hispidus* var. *greenmanii* Benson, *R. hispidus* var. *marylandicus* (Poir.) Benson, *R. repens* var. *marylandicus* (Poir.) T. &. G., *R. septentrionalis* var. *marylandicus* (Poir.) Chapm.

Habitats: Open, dry woodlands, hillsides and banks

Habit: Erect, terrestrial perennials

Variation: The large synonymy reflects variation in pubescence and number of petals as well as misunderstanding of a foliar leaf-development sequence (see Duncan, 1980). Occasionally plants are found with reflexed sepals. (2n = 32)

17b. *R. hispidus* var. *caricetorum* (Greene) Duncan

Synonyms: *Ranunculus septentrionalis* Poir. (of recent authors and manuals) *R. intermedius* Eat., *R. caricetorum* Greene, *R. sicaeformis* Mack. & Bush, *R. septentrionalis* var. *caricetorum* (Greene) Fern.

Habitats: Wet woods, marshes, swales and shores of lakes and streams

Habit: Repent or stoloniferous, palustrine perennials

Variation: Plants vary greatly in pubescence, leaf color and robustness, but recognition of further taxonomic subdivisions seems unwise. (2n = 64)

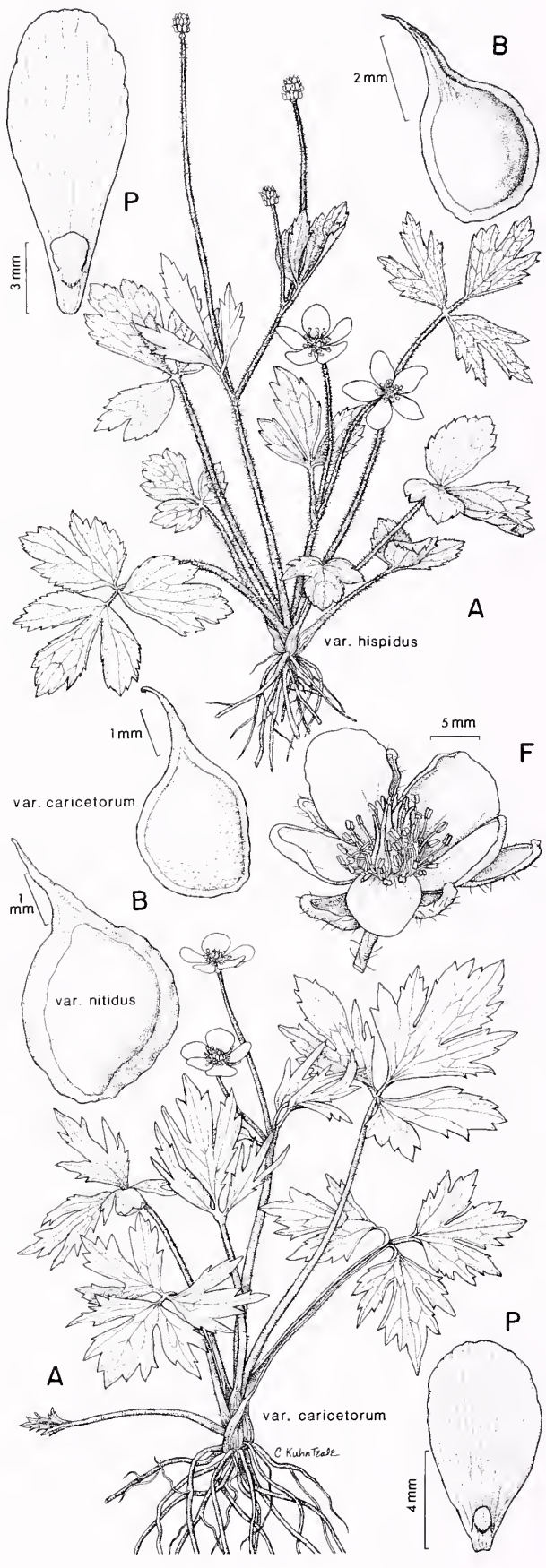
17c. *R. hispidus* var. *nitidus* (Muhl. ex Ell.) Duncan

Synonyms: *Ranunculus septentrionalis* Poir., *R. carolinianus* DC., *R. hirtipes* Greene, *R. nitidus* Muhl., ex Ell. *R. palmatus* Ell., *R. repens* var. *nitidus* (Muhl.) Chapm., *R. septentrionalis* var. *pterocarpus* Benson, *R. hispidus* var. *nitidus* (Ell.) Duncan

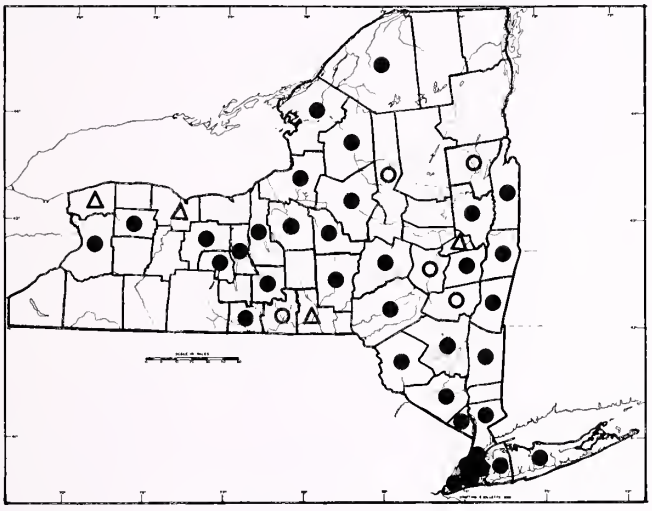
Habitats: Wet woods, Riverbottoms, swamps and ditches

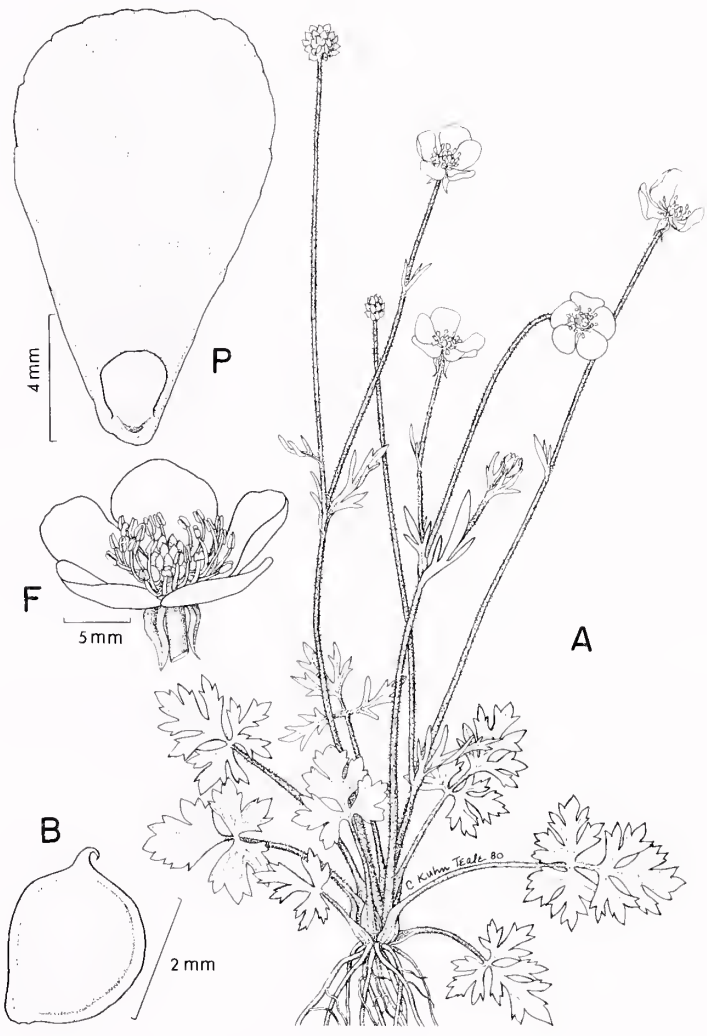
Habit: Sprawling or stoloniferous, palustrine perennials

Nomenclature and Variation: The varietal names, their subsequent uses by authors and the actual variation displayed by this plant group are interlocked in confusion. Muhlenberg (1818), who authored the name, *nitidus*, expressed doubt as to whether it was a variety of *R. repens* ("*an varieras repentis*?"). Elliott (1821), who took up Muhlenberg's name, described the plant as having reflexed sepals and differing from *R. repens* by its lack of runners. Variety *nitidus* may have stolons or they may be absent as in Elliott's southern popula-



tions. Elliott also briefly discussed glabrous forms of *R. repens* as well as concurring that the leaves of "*R. nitidus*" are shiny, as the name indicates. Chapman (1860) reduced *R. nitidus* to varietal status under *R. repens* (1860), then under *R. septentrionalis* (1892). Benson (1948) observed the correlation between prominent achene margins and stoloniferous southern populations (unlike Elliott's), and eventually assigned these plants full species rank (*R. carolinianus*). Duncan (1980) recognized var. *nitidus* under *R. hispidus*, and emended the concept of the distribution of the plants. The combination of reflexed sepals, wide achene margins and stoloniferous habit can be found in populations ranging from the deep south to New York and Minnesota. Especially in those populations from South Carolina and Georgia stolons may be absent.
(2n = 32)





18. ***Ranunculus bulbosus*** **L.**

Common Names: Bulbous Buttercup, Bulbous Crowfoot, Meadow-bloom, Gill Cup, St. Anthony's Turnip

Type Description: Linnaeus, Species Pl., p. 554, 1753

Synonym: *Ranunculus tuberosus* Hornem.

Origin: Europe

Habitats: Sunny, often rocky places, limestone ledges, waste places, roadsides, gardens, lawns, ditches, fields and streambeds

Habit: Erect perennials with corms

Flowering: April–June

Fruiting: April–July

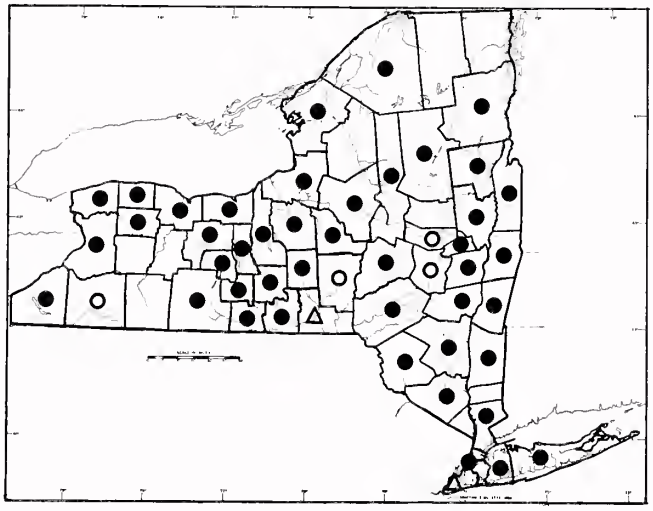
General Distribution: A weedy escape throughout most of boreal North America (native and also weedy in Europe)

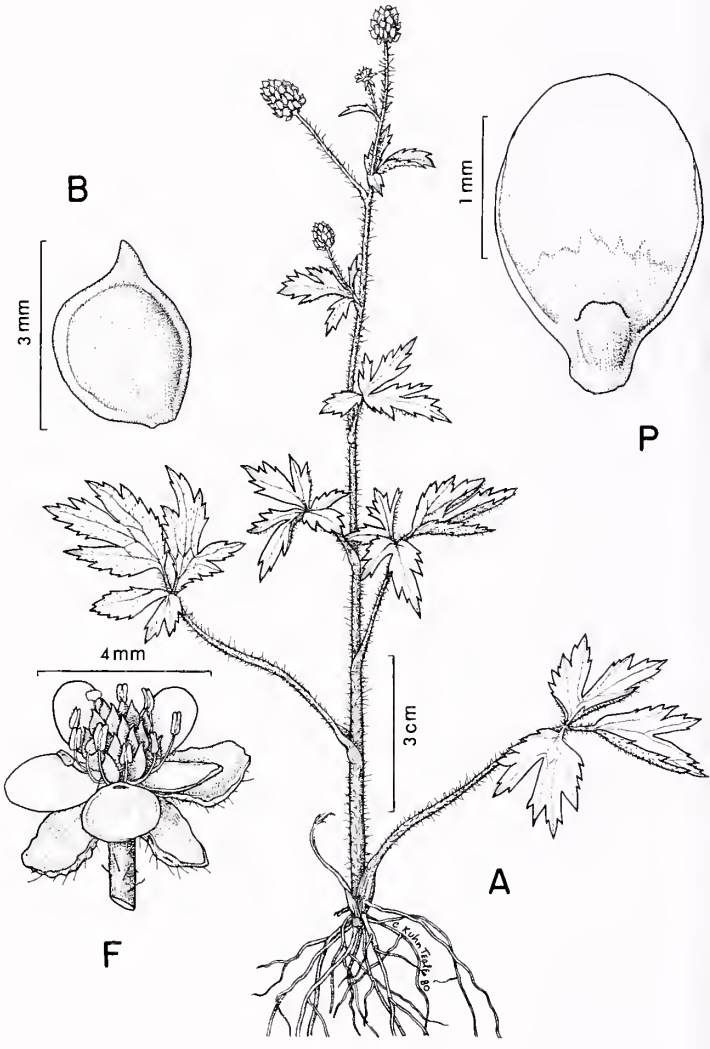
Description: Plants usually with **bisexual** flowers; **stigma** 1 per ovary, persistent in fruit, linear to diffuse, covering the upper adaxial surface of the **style**; style 1 per **ovary**, eccentric, short, somewhat recurved; **ovaries** 15–40, ca 1 mm long, clustered on a conical, pubescent **receptacle**, becoming a globose **head of achenes** 5–10 mm long, 5–10 mm wide; **achenes** 2.5–3.5 mm long, 2–3 mm wide; obovate, strongly margined and keeled, each with a prominent, eccentric, curved **beak (persistent style)** which is 0.4–0.7 mm long; **stamens** 40–80, 4–5 mm long; **anthers** elliptic; **filaments** slender; **petals** 5 (−10), yellow, 7–14 mm long, 7–10 mm wide, broadly obovate, each with a basal **nectary scale**; nectary scale ca 1 **mm** long, broadly obovate, attached laterally only in the lower ¼ of its length; **sepals** 5 (−12) **greenish**, 6–8 **mm** long, 3–5 mm wide, lance-acute with few long, sericeous hairs, sepals promptly **reflexed** (90° or more); flowers **born** in an irregular cyme, the **inflorescence** few-flowered with elongating

pedicels; pedicels 9–15 cm long in fruit with furrows near the tip, silky-haired, subtended by 3 to several **involucral leaves** with deeply cut, linear segments; **cauline leaves** few, smaller than most basal leaves and similar, but with more linear segments; **basal leaves** deltoid in outline, 2–7 cm long, 1–5 cm wide, ternately compound or biternately lobed, the terminal leaflet stalked, leaflets varying from obovate to linear, lightly sericeous above to densely silky below; **petioles** villous, up to 20 cm long; **stem** erect, somewhat branched, 15–50 (70) cm tall; **nodes** and **internodes** sparsely to densely pubescent; plants arising from a perennial **corm** 2–14 mm in diameter; **roots** all adventiteous, slender, fibrous or fleshy. (2n = 16)

Infraspecific Variation: Six subspecies are recognized in Europe where the species is native. Two varieties have been historically reported for New York State. These are var. *valdepubens* (Jord.) Briq., a conspicuously hairy type with flattened corms and leaves with short, broad segments, and var. *dissectus* Babey, with narrowly linear to oblong leaf segments. These do not correlate with the European subspecies concept and probably do not deserve recognition.

Importance: This species may be poisonous to livetock if eaten in quantity.





19. *Ranunculus pensylvanicus* L.f.

Common Names: Bristly Buttercup, Bristly Crowfoot

Type Description: Linnaeus f. Suppl., p. 272, 1781

Synonym: *Ranunculus canadensis* Jacq.

Origin: Northern North America

Habitats: Wet soil of marshes, meadows, swamps and shores

Habit: Erect, herbaceous annuals

Flowering: (June) July–October

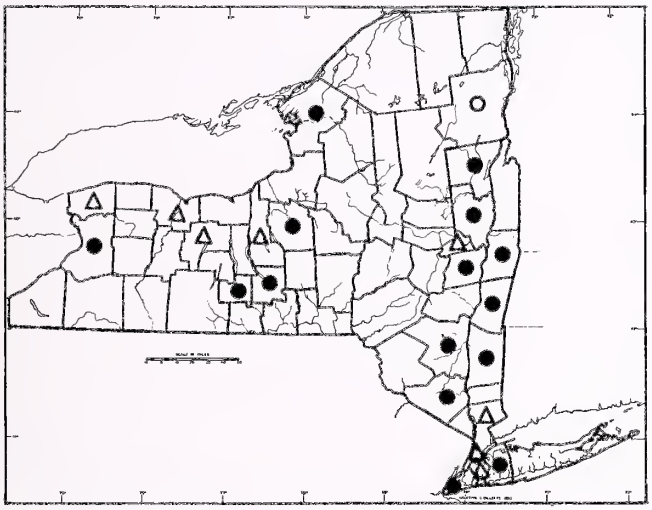
Fruiting: July–October

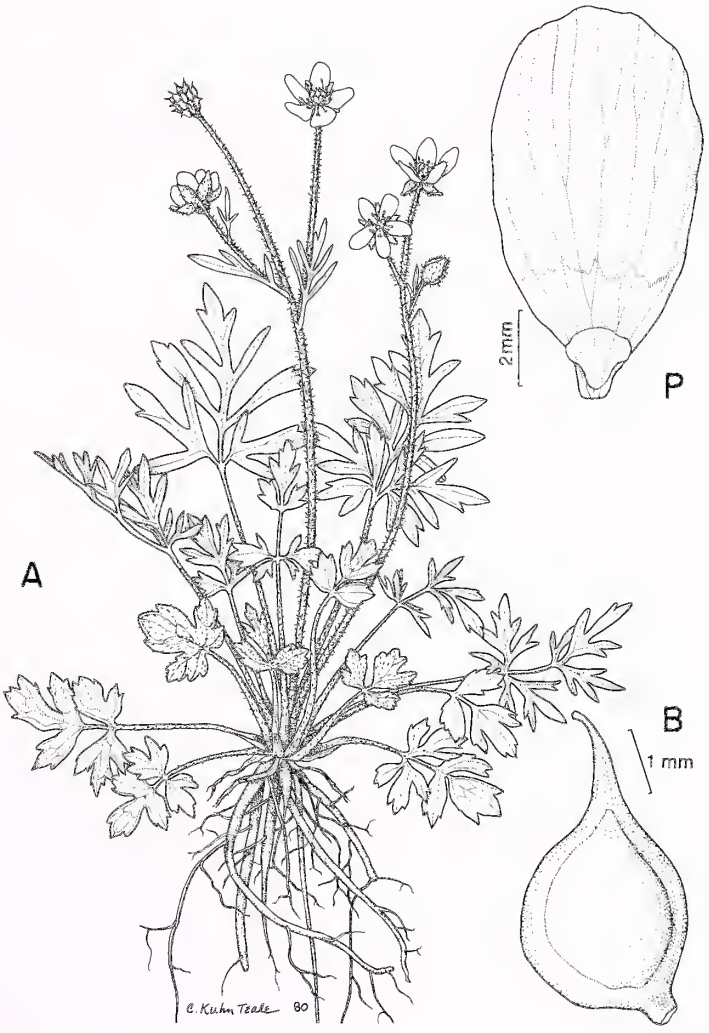
General Distribution: Newfoundland to New Jersey, west to Alaska and Arizona (China, Burma)

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, minute, apical; **style** 1 per ovary, subulate, up to 1 mm long, apical, but slightly adaxially eccentric, persistent; **ovaries** 60–100, clustered on an elongating, lanceolate to narrowly elliptic, sparsely hispid **receptacle** ca 2 mm long in flower, becoming a cylindric to ovoid **head of achenes** 9–15 (20) mm long, 7–10 mm wide; **achenes** flattened, obovate, 2–3 mm long and wide, narrowly margined, ± keeled, surface minutely pitted (under magnification); **persistent style (beak)** stout, greenish, straight

or slightly recurved, 0.5–1 mm long; **stamens** (15) 20–30, spiraling, 2.5–4.5 long; **anthers** elliptic; **filaments** slender; **petals** 5, oval, clawed at bases, 2–5 mm long, 2–4 mm wide, usually shorter than sepals, each petal with a basal **nectary**; **nectary scale** pocket-like or laterally free (upper third), obdeltoid or obovate, ca 0.5 mm long, apex variable, rounded to truncate or slightly retuse; **sepals** 5, ovate to elliptic cucullate, 2.5–5.5 mm long, yellowish-green to whitish reflexed, sparsely hispid on lower surfaces, deciduous; **inflorescence** irregularly cymose-corymbose, **flowers** borne singly on pedicels which elongate mostly in bud; **pedicels** 1–2 cm long in flower, 1.5–3 (5.5) cm long in fruit, pubescent; **subtending leaves** similar to cauline leaves, but smaller and less dissected; **cauline leaves** largest toward the middle of the plant, 3–10 cm long, 5–14 cm wide, ternately compound; **leaflets** hirsute to hispid, petiolulate, margins strongly toothed, tips often with hydathodes, bases rounded to cuneate, terminal leaflet often ternately lobed the lateral ones usually 2-lobed; **petiolules** longest on the terminal leaflets; **cauline petioles** (up to 7 cm) hirsute to hispid, with 1–2.5 cm long **sheathing bases**; **basal leaves** similar in shape to cauline leaves, smaller, often withering early, their **petioles** up to 19 cm long; **stems** erect or ascending, branched, up to 1 m tall, 2 cm in diameter, usually strongly hispid with hairs to 2 mm long; **roots** stout, fibrous.

Importance: Like other species of the genus it is reported to be poisonous.





20. *Ranunculus fascicularis* Muhl. ex Bigel.

Common Names: Early Buttercup, "Prairie Buttercup"

Type Description: Muhlenberg in Bigelow, Fl. Bost. ed. 1, p. 137, 1814

Synonyms: *Ranunculus apricus* Greene, *R. illinoensis* Greene, *R. fascicularis* var. *apricus* (Greene) Fern., *R. fascicularis* var. *deforestii* Davis, *R. fascicularis* var. *typicus* Bens.

Origin: Central United States

Habitats: Rock outcrops, prairies, hillsides, pastures, calcareous flatrock

Habit: Low-growing perennials

Flowering: April–May

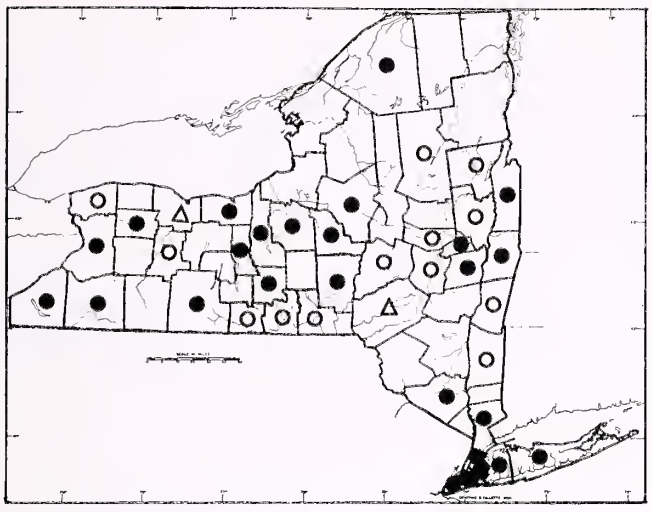
Fruiting: May–June

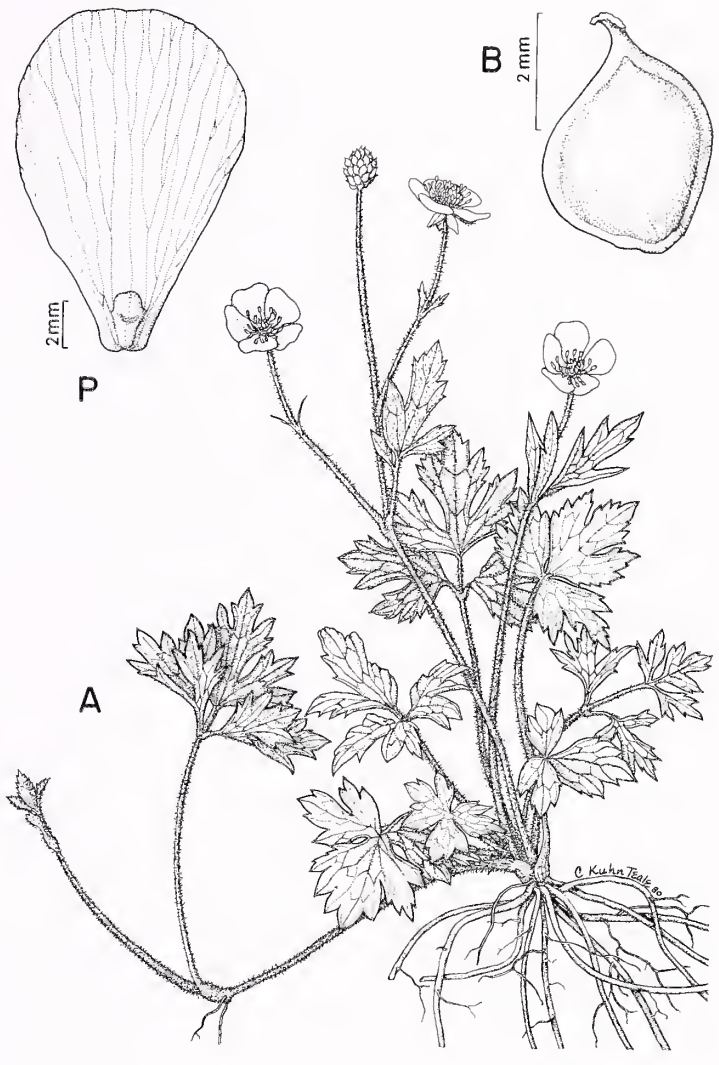
General Distribution: Eastern U.S. and southeastern Canada, Massachusetts to Minnesota, south to Georgia and Texas

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, minute, apical; **style** 1 per ovary, 1–3 mm long, tapered, ± adaxially falcate, confluent at base where the style is as wide as the apex of the ovary, persistent in fruit; **ovaries** 10–40 clustered on an elongating fusiform to conic, sparsely hispid and pustulose **receptacle,** ca 2 mm long in flower, becoming a turbinate or ovoid **head of achenes,** 4–9 mm long, 4–10 mm wide; **achenes** orbicular to weakly obovate, biconvex, 1.5–3.5 mm long, 1.5–3.0 mm wide, weakly margined or with a prominent abaxial margin; **persistent style (beak)** tapered from a broad base, straight or falcate, up to 3.3 mm long (rarely withered); achenes with short, flat **basal stalks**; **stamens** (30) 35–50 (64), spiraling, 2–4 mm long; **anthers** elliptic; **filaments** slender; **petals** 5–8 (10), yellow, elliptic to obovate, glabrous to sparsely pubescent, 6–10 (15) mm long, 4–8 mm wide, each with a basal **nectary** covered by a scale; **nectary scale** ca 1.5 mm long, obcordate or fan-shaped, laterally free and flap-like; **sepals** 5, cucullate, greenish-yellow to whitish, 6–10 mm long, 3–5 mm wide, patulous or somewhat drooping, lanceolate to ovate, densely pubescent, deciduous; **inflorescence** commonly scapose but often obscurely cymose and few-flowered, **flowers** borne singly on elongating **pedicels**; pedicels 1–5 mm long in flower, up to 9 cm long in fruit, villous, often densely so; **subtending leaves** reduced, simple and linear-oblong or pinnately dissected, sessile or short-petioled; **cauline leaves** similar or less dissected than the larger **basal leaves**; basal leaves in a rosette, ternate to bipinnate, or more commonly pinnate-pinnatifid with 3–5 divisions, blades 2–7 cm long, 2–4 cm wide, oblong or lanceolate in outline, silky pubescent; **petioles** 2–10 cm long, often with a silvery tomentum of appressed hairs; **stipular leaf bases** up to 4 cm long, apically truncate to tapering, often glabrous; **stems** 1–several, erect, not rooting at **nodes,** fistulose, slender, up to 25 cm tall, arising from a short, vertical, annually renewed **caudex**; **roots** dimorphic, slender and fibrous or tuberous (fusiform or clavate) up to 5 mm wide, 4 mm long. (2n = 32)

Infraspecific Variation: No varieties are recognized by Duncan (1980). Most variation in the species occurs outside our range.

Importance: Like other species of the genus, it is reported poisonous.





21. *Ranunculus repens* L.

Common Names: Creeping Buttercup, Clinton's Buttercup, Spotted-leaf Buttercup, Meg-many-feet, Hod-the-rake, Toad-tether

Type Description: Linnaeus, Species Pl., p. 554, 1753

Synonyms: *Ranunculus clintonii* Beck, *R. prostratus* Poir., *R. tomentosus* Poir., *R. pubescens* Lag., *R. lagascanus* DC., *R. reptabundus* Jordan, *R. repens* var. *pleniflorus* Fern., *R. repens* var. *glabratus* DC., *R. repens* var. *villosus* LaMotte, *R. repens* var. *erectus* DC., *R. repens* var. *linearilobus* DC., *R. repens* var. *prostratus* Gaud.

Origin: Eurasia

Habitats: Wet woods, alluvia, ditches, moist pastures, roadsides, fields, lawns, shores; weedy almost anywhere the water table is high

Habit: Prostrate to erect, stoloniferous perennials

Flowering: May–July (through to October in wet years)

Fruiting: June–July (occasionally through October)

General Distribution: An almost cosmopolitan weed.

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, linear to diffuse and covering the upper adaxial surfaces of the **style**; style 1 per ovary, eccentric, deltoid, recurved, ca 1 mm long; **ovaries** 20–25 (50), clustered on a subglobose to ovoid **receptacle** which is usually pubescent and ca 1 mm long in flower, becoming a globose **head of achenes** 5–7 mm wide, 4–6 mm long; **achenes** obliquely obovate, flattened to weakly biconvex, 2.5–3.0 mm long, 2.0–2.2 mm wide, margined, surfaces glabrous, essentially smooth, but finely granular under magnification, dark brown when ripe; **persistent style (beak)** ca 1 (–2) mm long, with persistent stigma at apex; **stamens** 50–80, spiraled, 4–5 mm long; **anthers** elliptic; **filaments** slender; **petals** (4) 5 (–13) or very numerous in "double" flowers, bright, glossy yellow, 6–12 mm long, 5–10 mm wide, ovate to obovate, narrowed at bases, deciduous, each with a small basal **nectary** covered by a scale; **nectary scale** obovate with a rounded or obcordate tip, laterally adnate at base but free in the upper ¾ of its length; **sepals** 5 (–13), greenish-yellow, deciduous, not reflexed, cucullate, 5–7 mm long, with long hairs on undersurfaces; **flowers borne singly** on elongating pedicels, generally 2 per stem (cymose in some horticultural forms); **pedicels** pubescent, sulcate, 2–10 cm long in flower, 4–15 cm long in fruit; **subtending** leaves lanceolate or linear to linear-lobed ternate; **cauline leaves** reduced upward with shorter petioles, lower ones much like **basal leaves**; basal leaves ternately (biternately) compound, 1.5–6 (11) cm long, 2–8 (13) cm

wide, triangular to triangular-ovate or pentagonal in outline, principle divisions sessile to stalked, the terminal **petiolule** up to 4 cm long, the laterals up to 2 cm, leaflets 3 (–5), usually ternately lobed and toothed or scalloped with **hydathodes** at the tips, cuneate to cordate at bases; **petioles** 4–25 cm long, densely pubescent to nearly glabrous, with expanded somewhat clasping, 0.5–2.0 cm long bases which are tapered, truncated or auricled at the junction with the petiole stalk; **flowering stems** erect or nearly so, densely pubescent to glabrous, producing sprawling **stolons** which leaf out and root at the **nodes**; **stems** and stolons arising from a premorse vertical **rhizome** with filiform **roots.** (2n = 32, also counts of 12, 16, 18, 20, 24, 28)

Infraspecific Variation: Numerous varieties have been described on pubescence, leaf shape and other variable characters (see synonymy). One striking variety is worthy of recognition: var. *degeneratus* Schur (var. *plenifolius* Fern.) has numerous petals, robust habit, thicker leaves with scalloped or crenate margins and the terminal leaflets are cordate.

Importance: The variety *degeneratus* is commonly found in cultivation. Like other Buttercups the species is reportedly poisonous.

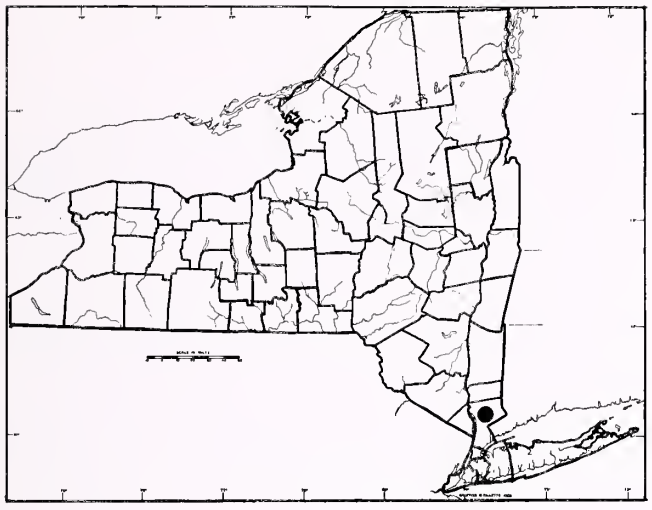
Waifs: *Ranunculus sardous* L. (Oneida, Madison Co. & N.Y. City); *Ranunculus cordiger* Viv. (On ballast, N.Y. City) as *R. philonotis; Ranunculus muricatus* L. (Garden escape, Buffalo)

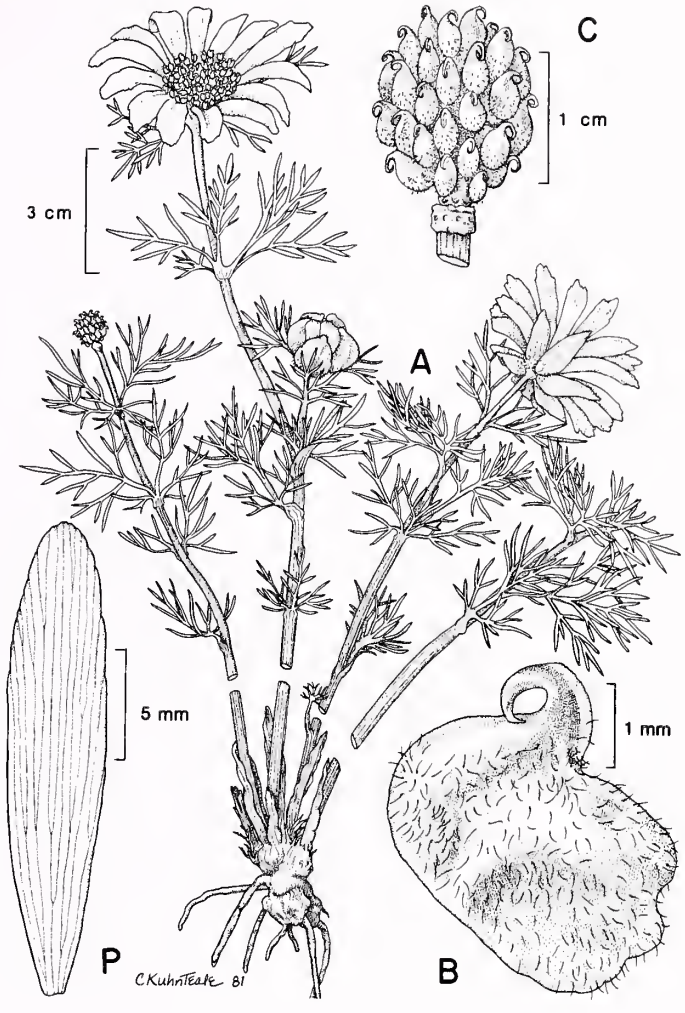
Mistaken Report: *Ranunculus pygmaeus* Wahl. in Gleason (1952) and Gleason and Cronquist (1963).

Note: *Ranunculus gmelinii* DC. is known from very near the borders of New York State with Canada and should be sought within the state. Other species which approach our range are: *R. rhomboideus* Goldie, *R. hederaceus* L. and *R. lapponicus* L.

13. ADONIS

Common Name: Pheasant's-eye
Authority: Linnaeus, Species Pl., p. 547, 1753
A genus of about 30 species of perennial and annual herbs in Eurasia. They resemble *Ranunculus*, but are without nectariferous scales or pits. About six species are commonly cultivated. Of these, *A. vernalis* escapes and persists in New York State, while *A. annua* has been reported as a waif.





1. *Adonis vernalis* L.

Common Names: Pheasant's-eye, Ox-eye, Spring Adonis

Type Description: Linnaeus, Species Pl., p. 547, 1753

Origin: Eastern Europe

Habitats: Escaping gardens, persisting on roadsides and in ditches

Habit: Erect or ascending, perennial herbs

Flowering: April–May

Fruiting: May–July

General Distribution: Escaping cultivation across boreal North America; native to eastern Europe

Description: Plants with **bisexual** flowers: **stigma** 1 per ovary, minute; **style** 1 per ovary, at first not well defined, 1–2 mm long and recurved and appressed to the achene in fruit; **ovaries** fusiform, quite numerous, in a capitate cluster, greenish becoming brown, villous toward their bases, developing into sub-globose **achenes;** achenes rugose, brown, ca 3.5 mm in diameter, villous below, borne in a globose to short-cylindric **head** 1–1.5 cm tall; **seed** 1 per fruit, suspended, ca 2.5 mm in diameter; **stamens** crowded, 70 to over 100; **filaments** 3–5 mm long, slender, somewhat flattened; **anther sacs** 2–2.5 mm long, less than 1 mm wide, golden; **staminodes** and **nectary scales absent; perianth** of two distinct series; **petals** 10–20, narrowly to broadly elliptic, ovate or obovate with acute, rounded or truncated (often erose) tips, bright yellow (white), 1.5–3.2 cm long, 0.4–1.6 mm wide; **sepals** 5 (–8) yellowish-green, obovate to ovate-lanceolate, 1–2 cm long, 3–9 mm wide. densely villous toward the base on the abaxial surface; **flowers** 4–8 cm wide, borne singly at the tips of branches; **peduncles** stout, caniculate, 1–4 cm long; **upper cauline leaves** sessile, 1–2-pinnatisect into linear, entire lobes, glabrous except very near the node where they may be villous; **lower leaves** petioled, otherwise much like the upper ones; **petioles** 0–1.5 cm long, sheath-like and transitional to **scales;** scales 1–3 cm long, lanceolate, somewhat sheathing the stem near the base; **nodes** villous; **internodes** ribbed; **stems** branched, clumped, ascending or erect from a tough **rhizome** with leathery **roots.** (2n = 16)

Infraspecific Variation: The cultivar "Alba" has white flowers.

Importance: Extracts of *Adonis* have been used medicinally; the rhizomes and roots contain cardioactive glycosides (Adonidin), sometimes used instead of Digitalis where there is also kidney disease. Adonidin is actually a name used for a combinaton of glycosides. The plants also contain Cymarin and K-Strophanthin. Foliage and roots are reported to poison humans and livestock (at about 1% of body weight), causing gastric irritation, nervous symptoms and even death. *Adonis* is grown as a border or rock-garden plant.

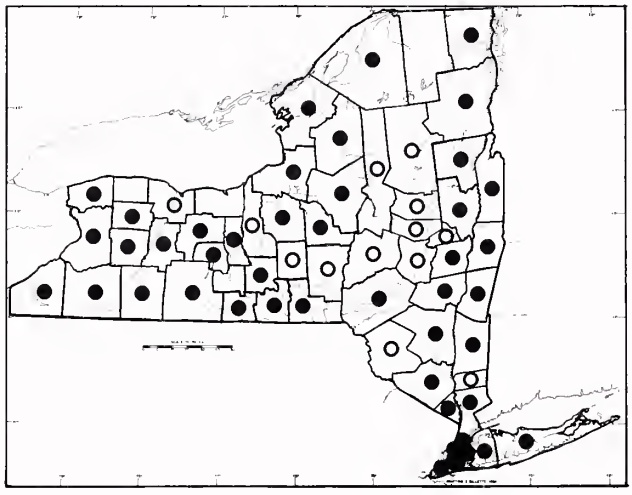
14. AQUILEGIA

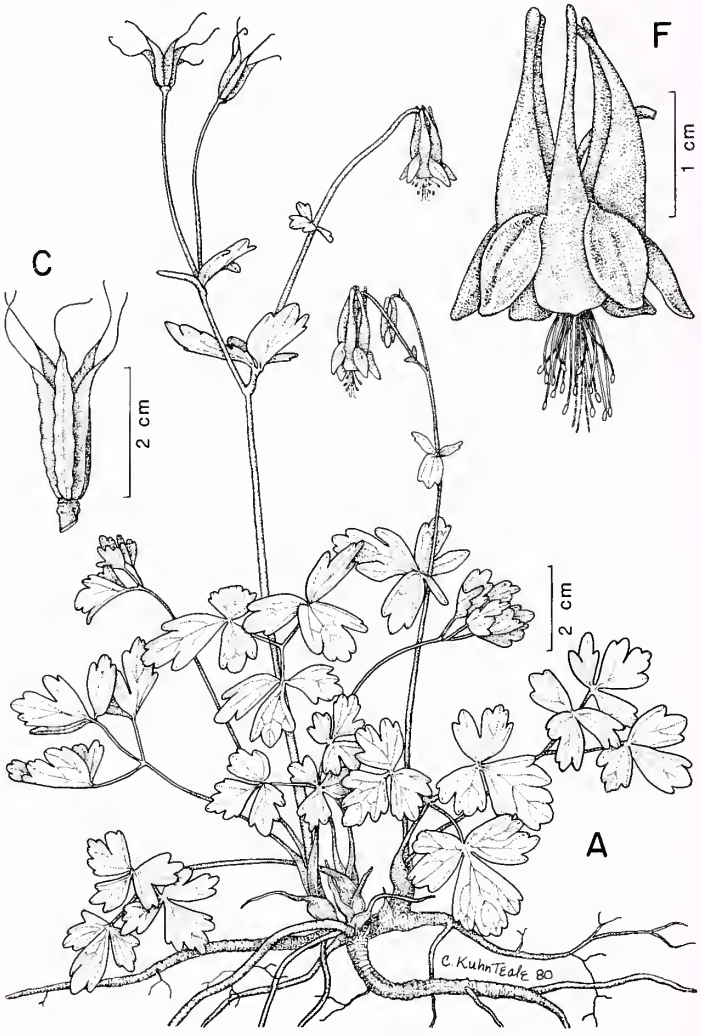
Common Name: Columbine

Authority: Linnaeus, Species Pl., p. 533, 1753

This genus has between 40 and 70 species worldwide, depending upon interpretation of the complex patterns of variation and hybridization found within its bounds. The major concentration of species is found in Eurasia, with a few North American representatives, mostly in the west. In the northeastern United States, native plants are of the *Aquilegia canadensis* complex, usually treated as a single species. *Aquilegia canadensis* is often cultivated, as is *A. vulgaris*, a European species which escapes and persists.

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, **style** 1, per ovary, slender, persistent; **ovaries** usually 5, fusiform, erect, becoming several-seeded **follicles**; **staminodes** present, interior to the **stamens**; stamens numerous, adnate near their bases (connivent); **petals** 5, prolonged backward into hollow **spurs** with **nectaries** at their tips, variously colored, red, yellow, blue, purple or white; **sepals** 5, colored much like the petals, alternating with, and protruding between them; **pedicels** usually slender; **bracts** simple or leaf-like; **inflorescence** a loose cyme or flowers borne in upper leaf axils, singly or in pairs; **leaves** bi- or triternate, or simple upward on the stem where they are much-reduced; **leaflets** variously lobed, cut or bluntly toothed; **petioles** reduced upward where they may be absent from upper leaves; **stems** simple to much branched, from a **caudex** or short **rhizome** which bears the fibrous **root system.**





1. *Aquilegia canadensis* L.

Common Names: Wild Columbine, Rock-bells, Meetinghouses, "Honeysuckle"

Type Description: Linnaeus, Species Pl., p. 533, 1753

Synonyms: *Aquilegia coccinea* Small, *A. latiuscula* Rydb., *A. variegata* Moench., *A. elegans* Salisb., *A. australis* Small (in part)

Origin: Eastern North America

Habitats: Rocky forest, shaded cliffs, sandy woods, ravines, moist river bluffs, less commonly meadow and bog margins

Habit: Ascending to erect, perennial herbs

Flowering: April–June

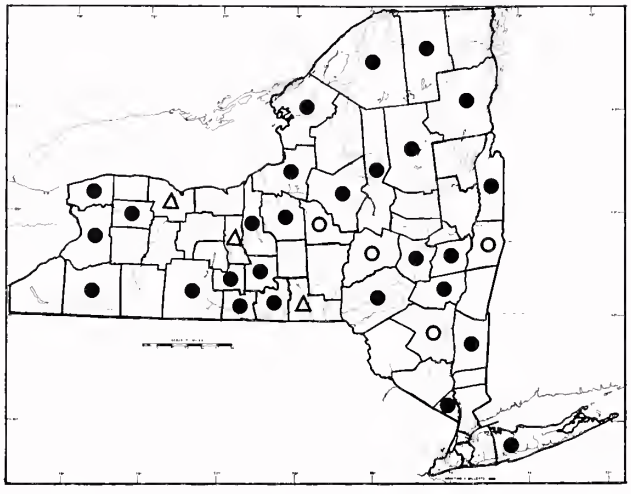
Fruiting: May–August

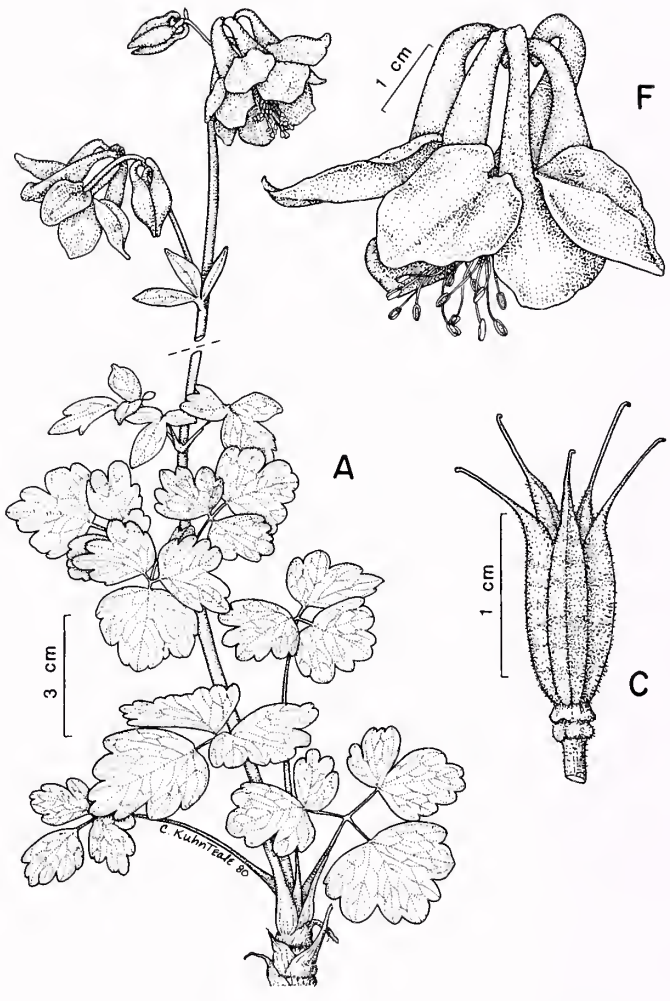
General Distribution: Nova Scotia to Manitoba, Nebraska, south to Arkansas, n. Alabama and n. Georgia (n. Florida)

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, minute, slightly hooked; **style** 1 per ovary, filiform, 0.9–1.8 cm long, often exceeding the stamens and somewhat twisted, persistent; **ovaries** usually 5, free or cohering slightly at bases, fusiform, 4–6 mm long, ca 1 mm wide; densely villous, with several **ovules**, each ovary becoming a **follicle** in fruit; follicles 5, erect, 1.4–2.6 cm long, 3–7 mm wide, cylindric with tapered tips and persistent styles, dehiscing by adaxial sutures near the apices, prominently veiny, greenish-tan to dark brown, villous, bearing numerous **seeds**; seeds about 1.5 mm long, dark brown, semi-lustrous, curved, slightly angled, with one acute and one blunt tip; **staminodes** 5–10, interior to stamens, 5–7 mm long, pale, fleshy, up to 0.3 mm wide, surrounding the young ovaries; **stamens** about 25–40, 8–15 mm long; **filaments** usually filiform, but some expanded below to resemble staminodia; **anthers** golden, ca 1 mm long; **petals** 5 each with a limb and a backward-directed spur; **petal limbs** trapezoidal, about 4mm long and wide with a blunt **mucro** at the tip, creamy yellow, blending to red where they diverge from the adaxial rims of the **spurs**; spurs usually red, 4–7 mm wide at the mouth, tapering to ca 1 mm, 1.1–2.2 (2.7) cm long, tipped with globose **nectaries** 1.5–2 mm in diameter; **sepals** 5, protruding between the petals, 5–18 (20) mm long, 3–9 mm wide, broadly ovate to ovate-lanceolate with acute to apiculate tips, usually red, sometimes yellowish tinged; **pedicels** 1–15 cm long, glabrous to densely villous-glandular; **bracteoles** 1–6 mm long, lanceolate, villous; **upper leaves** bract-like, simple, lobed or of 2 or more leaflets, often sessile or with slightly sheathing bases; **basal leaves** and lower cauline ones petioled, bi- or triternate; **leaflets** 1–3 cm long and wide, usually lobed and cut, the lobes blunt and variable in size, often glabrous above, but the lower surfaces may be densely villous; **petiolules** glabrous to villous, 0–3 mm long; **petioles** usually villous, weakly ribbed, up to 18 cm long, strongly ribbed and sheathing at bases; **stems** strongly ribbed, glabrous above to densely villous at base, often branched from about the middle, arising from a tough, fibrous **caudex** and branching, lateral **rhizome system,** 0.5–1.2 cm in diameter, with profuse, fibrous **roots.** (2n = 14)

Infraspecific Variation: Color forms are known, and these have been recognized as forms and varieties; forma *albiflora* House is known from Onondaga and Bronx Counties and forma *flaviflora* (Tenn.) Britt. is known from Albany and Dutchess Counties. Disjunct populations in northern Florida, once recognized as *A. australis* Small, are more slender and branched, paler in both foliage and flower color, with lanceolate sepals. So-called *A. coccinea* Small has a more robust appearance than typical *A. canadensis;* the flowers are large, with stout spurs and the follicles are at the upper size limits. The plants have much the same range as typical *A. canadensis*, but often bloom a couple of weeks later in adjacent locations. Their habitats are usually moister and more open, such as meadows, swales and bogs. Fernald (1950) recognized four varieties, including the entities discussed above and var. *latiuscula* (Green) Munz, with smaller flowers, often ternately compound leaves and more cut leaflets. This complex deserves careful genetic and biosystematic study. *Aquilegia canadensis*, like other members of the genus, hybridizes freely with other species.

Importance: *Aquilegia canadensis* is grown as a garden ornamental in partially shaded areas or rock gardens. The cultivar "Nana" is only about a foot tall, and makes a good border plant because of its sun tolerance. *Aquilegia* species are poisonous; the seeds have been reported as cause of death in children. Early reports of medicinal uses are vague and unsatisfactory in the light of harmful properties which produce symptoms similar to those of Aconite poisoning.





2. ***Aquilegia vulgaris*** **L.**

Common Names: Blue or Purple Columbine, European Columbine, Garden Columbine, European Crowfoot, Garden Crowfoot

Type Description: Linnaeus, Species Pl., p.533, 1753

Origin: Boreal Eurasia

Habitats: Old fields and roadsides, waste places, as a persistent garden escape

Habit: Ascending to erect, perennial herbs

Flowering: May–July

Fruiting: June–September

General Distribution: Escaping from cultivation in cooler climates circumboreally

Description: Plant with **bisexual** flowers; **stigma** 1 per ovary, slightly hooked, each at the tip of a filiform **style,** 7–11 mm long; **ovaries** usually 5, fusiform, densely villous, 4–5 mm long, with numerous **ovules,** each ovary becoming a many-seeded **follicle** in fruit; follicles 5, erect, somewhat fused near the bases 15–28 cm long, 4–6 mm wide, fusiform, dehiscing by terminal-adaxial sutures, tips with **persistent styles,** walls veiny, greenish-tan to brown, villous and glandular; **seeds** oblong-lenticular with a sharp keel along one edge, shiny brownish-black, 3 mm long by 1.5 mm wide; **staminodes** 8–10, interior to the stamens, whitish, opaque to hyaline, lanceolate, with blunt tips, ca 5 mm long, 1 mm wide; **stamens** about 25–30, 6–12 mm long; **filaments** slender or slightly expanded toward bases; **anthers** ca 1.5 mm long, golden; **petals** 5, with a limb and backward directed spur; **petal limbs** broadly triangular with acute to obtuse tips, 0.6–1.2 cm long, 0.5–1.0 mm wide, usually blue-purple (pink); **spurs** 1.0–2.6 cm long, colored like the limbs, broad at the mouth (up to 1.3 cm), each tapering rather abruptly to a constricted area which is often recurved and bears a **nectary** at its tip; **sepals** lance-ovate, 1.6–2.5 cm long, 0.5–1.0 cm broad, petaloid, usually purple or colored like the petals; **pedicels** 1.5–11.0 cm long, villous; **bracteoles** lanceolate, villous, 3–5 m long; **bracts** 3-lobed, much like leaflets, densely villous below; **upper leaves** ternate, nearly sessile; **lower leaves** biternate (to triternate) with elongate axes; **leaflets** (1) 2–5 cm broad, (1) 2–4 cm long, cut and lobed, with rounded tips, mostly glabrous above, villous below; **petioles** villous, (0) 1–40 cm long, reduced up the stem; **stem** branched from above the middle, terete, villous to glandular, arising from a tough **caudex** with many fibrous **roots.** (2n = 14)

Infraspecific Variation and Hybridization: As with most cultivated Columbines, there has been much hybridization and introgression in the recent history of the species. A number of flower colors are known, including pink, white pale blue and salmon.

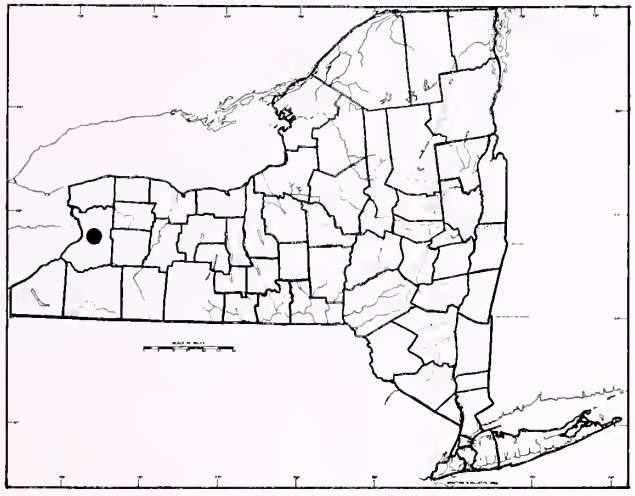
Importance: This species was more popular as a garden flower 50–100 years ago; populations which escaped long ago tend to be more uniform and retain their slightly smaller, purple flowers, whereas more recent collections show more variation. Like other Columbines, this species is poisonous.

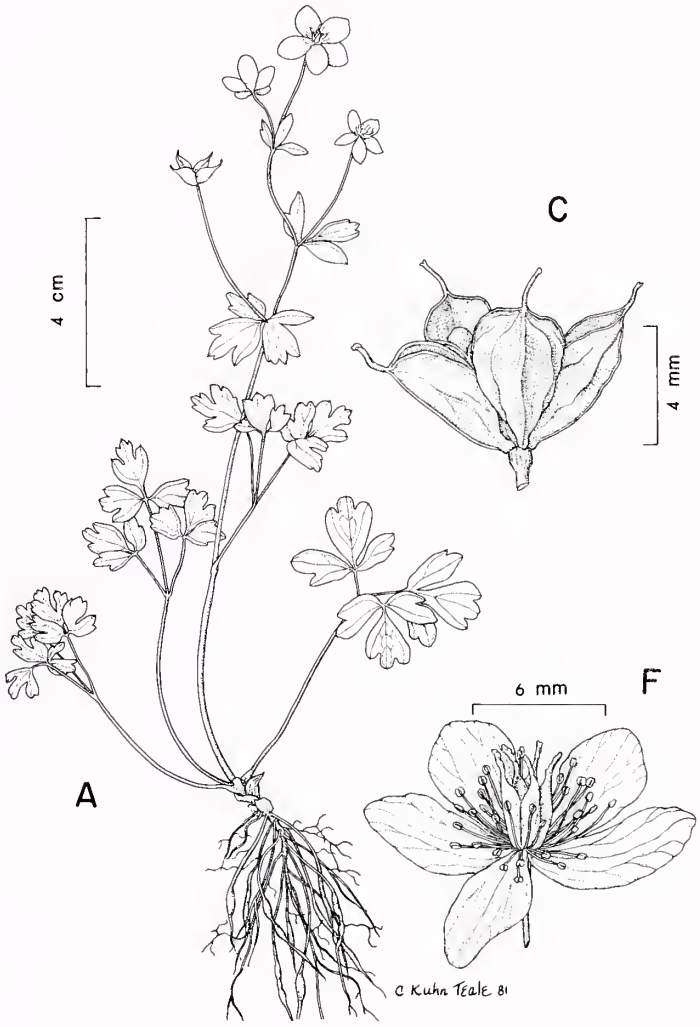
15. ISOPYRUM

Common Name: False Rue Anemone

Authority: Linnaeus, Species Pl., p. 557, 1753

A genus of about 25 species, mostly native to Asia, with a single species in Europe and several in western and central North America. They are sometimes cultivated.





1. ***Isopyrum biternatum*** **(Raf.) T. & G.**

Common Name: False Rue Anemone

Type Description: Rafinesque, Journ. Phys., Sci., p. 70, 1820

Synonym: *Enemion biternatum* Raf.

Origin: Central North America

Habitats: Calcareous woodlands and thickets in moist, rich soil

Habit: Erect, perennial herbs

Flowering: April—early June (earlier elsewhere)

Fruiting: May—June

General Distribution: (New York State) southern Ontario to Minnesota, south to west Florida and Arkansas (Texas)

Rarity Status: Possibly extirpated in New York State; known only from a single pre-1840 specimen labelled "Buffalo New York".

Description: Plants with bisexual flowers; **stigma** 1 per ovary, minute or slightly enlarged and recurved; **style** 1 per ovary, less than 1 mm long; **ovaries** 4 (3–6), oval, often swollen on one side, ca 1 mm long, on a small **receptacle**, **ovules** 2–4 (6); **follicles** divergent, 4–7 mm long, 3–4 (5) mm wide, somewhat compressed, greenish to tan, glabrous, with a few prominent veins and transverse veinlets, dehiscing by a suture along the swollen abaxial side; **persistent style (beak)** slender, ca 1 mm long; **seeds** 2–5, smooth; **stamens** mostly 25–30, ca 4 mm long; **anthers** subglobose; **filaments** clavate, slender below; **staminodes absent; perianth** of a single whorl of petaloid lobes; **perianth lobes (sepals)** 5 (-7), ovate, round-tipped (acute), 4–10 (14) mm long, 3–8 (11) mm wide, white; **peduncles** slender, glabrous, 8–25 mm long in flower, up to 4.8 cm long in fruit; **flowers** borne singly, axillary or terminal; **cauline leaves** biternate, much like the basal ones but smaller with shorter petioles; **basal leaves** biternate (triternate), 2–7 cm broad, the **leaflets** 4–18 (24) mm long, 2–14 (17) mm wide, (entire) 2–3 (5-)lobed with shallow to

deep sinuses, lobes round to acute-tipped, **leaflets** glabrous, darker green above; **petiolules** slender, up to 8 mm long; **petioles** glabrous, ribbed, up to 15 cm long in basal leaves, reduced upward to about 1 mm in leaves subtending the flowers; **stems** ribbed, glabrous, 10–20 (30) cm tall, from a tuberous **rootstock; lateral roots,** tough, fibrous. (2n = 14)

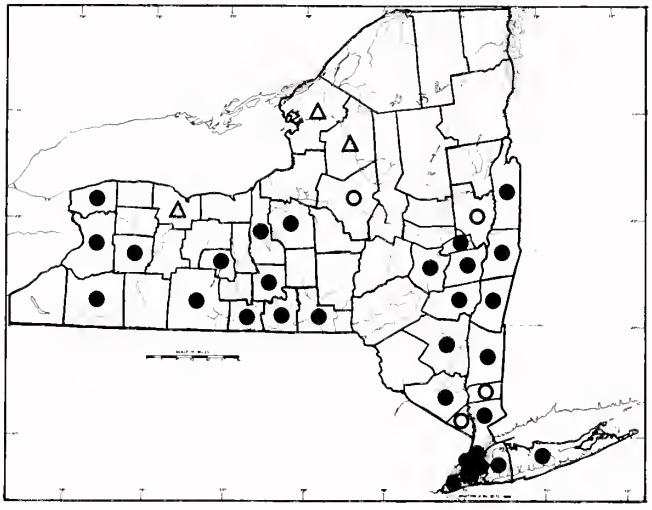
Note: Some recent authors (eg. Keener, 1977) have revived the genus *Enemion*.

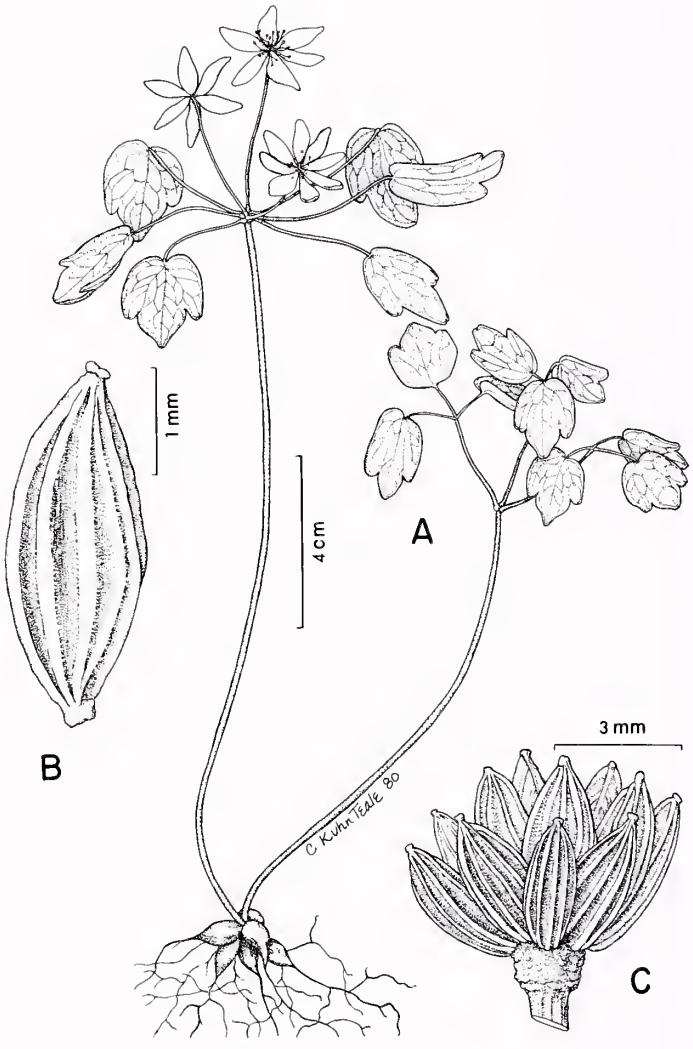
16. ANEMONELLA

Common Names: Rue Anemone

Authority: Spach, Hist. Veg. 7: 239, 1839

This genus has a single species, and partly for this reason it has been treated in various and often confusing ways. The two other genera to which the species has most often been ascribed are *Thalictrum* and *Anemone*, but it bears more superficial resemblance to *Isopyrum*. Nonetheless, we feel that it has enough individuality to stand on its own in a family where relationships are ancient and generic limits are shaky at best. This species is grown as an ornamental, and its tubers are sometimes used as food.





1. ***Anemonella thalictroides*** **(L.) Spach**

Common Names: Rue Anemone, Woods-potato, "Wild-potato"

Type Description: Linnaeus, Species Pl., p. 542, 1753

Synonyms: *Anemone thalictroides* L., *Thalictrum anemonoides* Michx., *Thalictrum thalictroides* (L.) Eames & Boiv., *Syndesmon thalictroides (L.) Hoffm.*

Origin: North American Arctotertiary

Habitats: Moist to dry woods and partial clearings

Habit: Low-growing, perennial herbs

Flowering: May—June (earlier elsewhere)

Fruiting: June—July

General Distribution: New Hampshire to Minnesota and Kansas, Oklahoma; mostly Appalachian southward to Arkansas (north Florida)

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, sessile, flat topped, persistent; **style** not evident; **ovaries** (5) 8–12 (15), free, fusiform, ribbed, 1–2 mm long, with a single pendulous **ovule**, each ovary becoming an **achene** in fruit; achenes 3.5–5 mm long, ca 1.5 mm wide, borne in an umbel-like cluster of (4) 6–15, tan to brown, fusiform, strongly 8-ribbed (10), each containing a single **seed** which is fusiform and minutely papillose; **stamens** 15–30; filaments slender, 1–4 mm long; **anthers** globose, golden, ca 0.3 mm long; **staminodes** and **petals** absent (except abortive flowers); **perianth parts (sepals)** separate, 5–10 (11), oval to narrowly oblong or obovate, white or pink-tinged, (2) 4–15 mm long, 2–1 mm wide; **inflorescence** a loose, terminal, umbel-like cluster of flowers, often of different sizes and stages of maturity; **pedicels** 1–3 (4) cm long, slender, glabrous, inconspicuously ribbed; **upper leaves** 2 (3), ternate but sessile, the **leaflets** arising from the plant apex with the flowers on **petiolules** 0.4–4.5 cm long (rarely sessile); **lower leaves** basal, 1 to 3-ternate, up to 25 cm tall; **leaflets** shallowly and bluntly 3-lobed (5), rarely unlobed, oval in outline, 1–2.5 cm broad and long, glabrous, paler beneath, showing intricate venation; **petioles** and other leaf axes slender, angled, petioles up to 20 cm long on the basal leaves, absent from the upper ones; **stipules** papery, hirsute, sheathing at the plant base; **stems** slender, glabrous, 8–35 cm tall, from a short **caudex** at the crown of a cluster of tuberous **roots**; roots fusiform, 1–4 cm long, up to 1.5 cm in diameter, starch-filled, the new ones generated from the caudex in spring. (2n = 42)

Infraspecific Variation: The flowers may be green in forma *chlorantha* Fassett. Teratological forms vary. As in *Ranunculus*, all flower parts may be petaloid (forma *favilliana* Bergs.)

Importance: The plants are a favorite in partially shaded, old-fashioned rock gardens. Tubers are boiled and eaten in Pennsylvania, where the plants are known as "Wild Potato".

17. THALICTRUM

Common Name: Meadow-rue

Authority: Linnaeus, Species Pl., p. 545, 1753

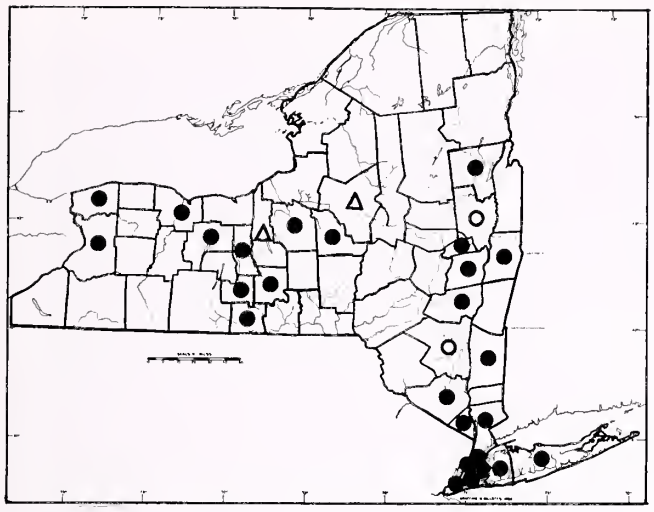
A genus of 50 or more species, primarily of woods and marshes in the North Temperate Zone. The circumboreal arctic-alpine species, *Thalictrum alpinum*, does not reach New York State. Meadow-rues are taxonomically difficult the world over, and our two, native species-pairs are no exceptions. Though the flowers of *Thalictrum* species are small, the stamens are showy, and the foliage, much like that of Columbines, makes them desirable for certain horticultural uses.

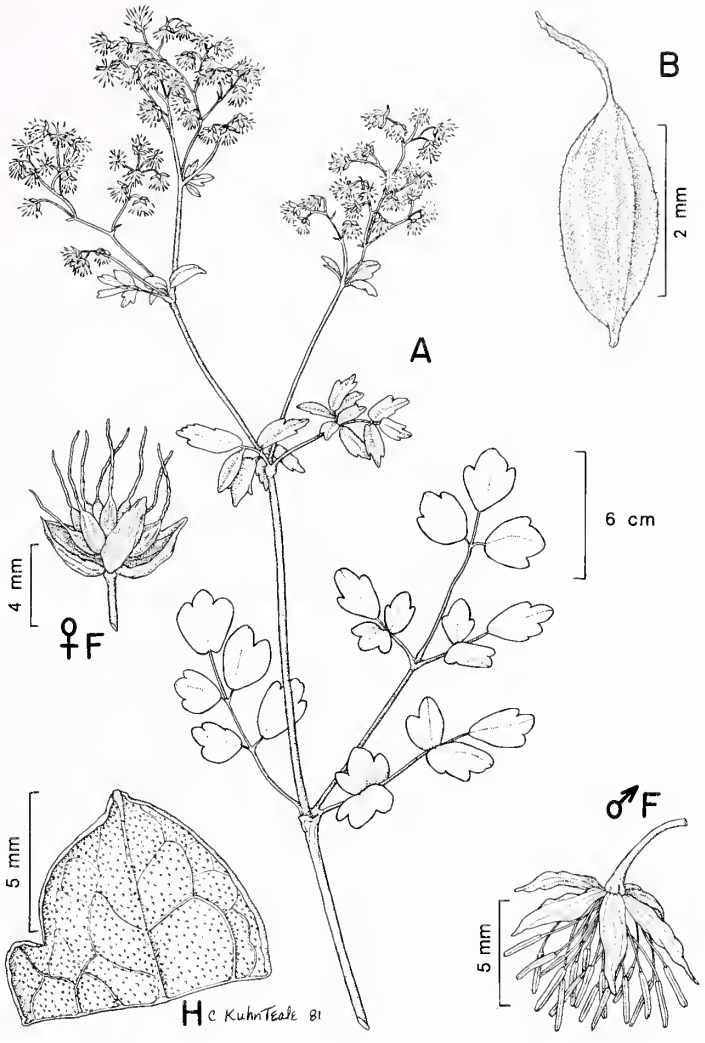
Description: Plants **polygamo-dioecious, dioecious** or with only **bisexual** flowers; **stigma** 1 per ovary, the stigmatic surface linear or S-shaped, covering most of one side of the style or enclosing it (together conventionally called stigma); **style** 1 per ovary, persistent or deciduous with the stigma; **ovaries** 4–15 (18), fusiform, becoming elongate, flattened or inflated **achenes** which are usually prominently veined or ribbed, borne **sessile** or on **stipes** in some species, 4–15 in number, in dense to lax, drooping clusters; **stamens** 6-many, showy; **filaments** dilated or filiform; **anthers** oblong to linear; **perianth** of a single series, often 4-parted, petaloid but usually inconspicuous, greenish to red-purple, cream or almost white, often early-deciduous; **pedicels** and **peduncles** slender to fleshy; **inflorescence** a panicle or raceme, sometimes nearly flat-topped; **bracts** of several types from scarious to leaf-like; **leaves** 1–4 ternately compound, larger toward the plant base, often grading into bracts above; **leaflets** orbicular to elongate, glabrous to pubescent and/or glandular, especially beneath, entire or more often 3-many lobed or toothed; **petiolules** variable in number and length; **petioles** variable in length or lacking, more or less dilated at the base, sometimes strongly sheathing at the node; **stipules** and **stipels** (of varying degrees) may be present; **stems** slender to stout, single or more often much-branched and ribbed, arising from a perennial **caudex,** with or without **rhizomes; root system** tough, fibrous.

KEY TO SPECIES OF THALICTRUM

1. Most leaflets with 4–5 (or more) lobes, often crenate ..... (4)
1. Most leaflets with 2–3 lobes or entire ..... (2)
   2. Stigmas (in fruit) mostly over 3 mm long, slender, not papillose, up to ¾ the achene length or more; filaments filiform, not clavate ..... *Thalictrum dasycarpum**
   2. Stigmas (in fruit) mostly under 3 mm long, thick and densely papillose, about ½ the achene length; filaments gradually dilated upward, clavate ..... (3)
3. Leaflets with dense to sparse, minute **glandular hairs** beneath (rarely glabrous) the margins strongly revolute, leathery textured, with prominent venation below ..... 1. *Thalictrum revolutum* (p.)
3. Leaflets with slender, **pilose hairs** beneath (rarely glabrous), not strongly revolute-margined or leathery, the venation below not raised or particularly prominent ..... 2. *Thalictrum pubescens* (p.)
   4. Basal caudex ascending, flexuous, from a horizontal rhizome; achenes somewhat bilateral, the few prominent ribs fusing toward a falcate tip; stigmas mostly persistent; blooming in June—July in rocky, open places ..... 3. *Thalictrum venulosum* (p.)
   4. Basal caudex erect, stiff; rhizomes, if present, branching laterally from the caudex; achenes fusiform, densely parallel-ribbed; stigmas mostly deciduous; blooming in April—May, usually in woodlands ..... 4. *Thalictrum dioicum* (p.)

* **Note:** *Thalictrum dasycarpum* Fisch. & Llal. (Purple Meadow-rue) is known from a single specimen (in fruit) from New York State. The location is on a well-traveled Adirondack trail, leaving suspicion that the plant might have been a waif. Until a well established colony is verified, the species will not be treated as a member of the flora. Reports of *T. dasycarpum* from the Buffalo and Albany areas have so far turned out to be based on incorrect identifications.





1. *Thalictrum revolutum* DC.

Common Names: Waxy Meadow-rue, Purple Meadow-rue, Skunk Meadow-rue

Type Description: DeCandolle, Syst. I., p. 173, 1818

Synonyms: *Thalictrum purpurascens* Pursh var. *ceriferum* Austin, cited in part by House (1924) as *T. dasycarpum* Fish. & Lall.

Origin: Eastern North America

Habitats: Rocky places, open woods, clearings, thickets, prairies, sandplains and barrens (rarely dry meadows)

Habit: Erect, branching perennial herbs

Flowering: May—July (September)

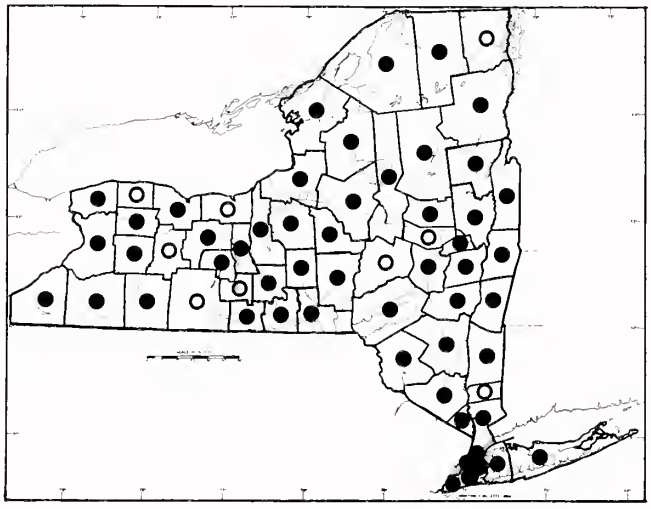
Fruiting: June—October

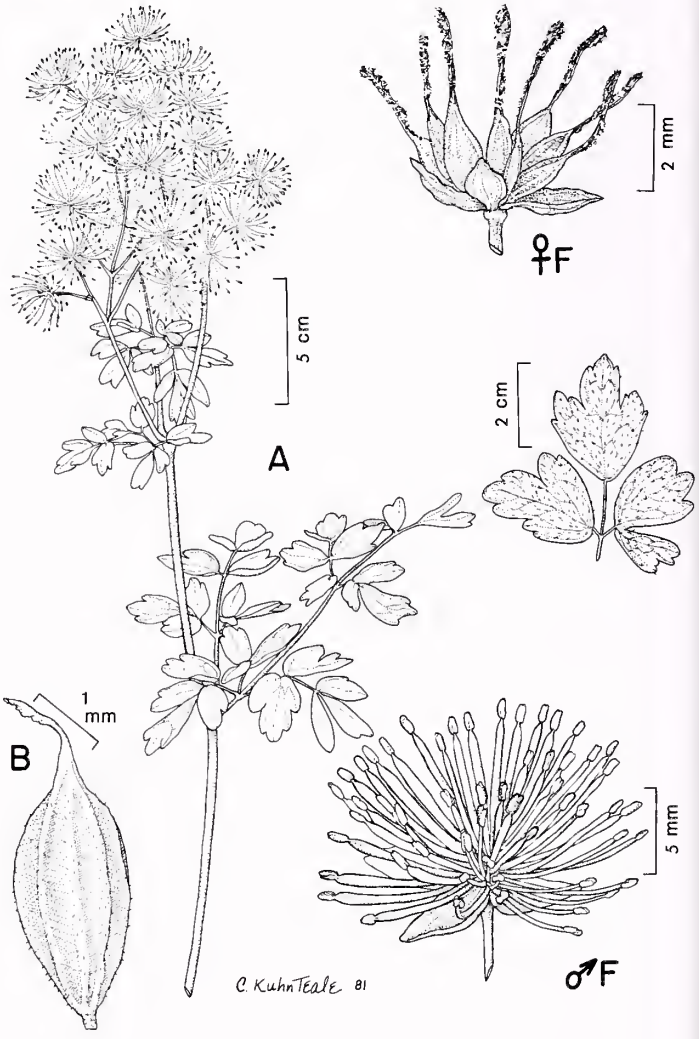
General Distribution: Massachusetts to Ontario, south to Florida and Arkansas

Description: Plants **dioecious** or **polygamo-dioecious**; **stigma** 1 per ovary, linear, densely glandular-papillose, 0.8–1.5 mm long, becoming up to 2.5 mm long, somewhat persistent until fruit is completely mature; **style** short, usually glandular-pubescent, persistent as a short beak; **ovaries** 5–15, fusiform, ribbed, ca 2 mm long, becoming **achenes** 3–5 (6) mm long, 2–3 mm wide, which are brownish, strongly (but sparsely) ribbed and obovate in outline, their surfaces often covered with tiny, glandular hairs; achenes borne in capitate **heads** of 5–12 (15); **seed** 1 per fruit, glossy brown, ca 2.5 mm in diameter; **stamens** numerous (few in bisexual flowers), 2–7 mm long, pale, showy, soon drooping; **filaments** slightly to conspicuously dilated toward their summits, clavate, with ridged to minutely scaly surfaces; **anthers** 1.5–2.8 mm long, golden; **perianth** parts 4–6, free, oval to obovate, petaloid, 1.5–2.3 mm long, 0.8–1.1 mm wide with erose margins, pale greenish-cream to purple-green, early decidouous; **pedicels** and **peduncles** glabrous or very slightly glandular, angled or grooved; **inflorescence** a series of racemes and panicles in the axils of upper leaflets and bracts, most plants either predominantly male or female; **bracts** green, leaf-like, lanceolate to oval or even lobed; **leaves** 2–3 pinnately compound, sessile (with stalked leaflets only) at the base of the inflorescence grading upward into bracts, petioled on lower parts of the stem; **leaflets** coriaceous, entire to 2–3 (5) lobed, narrowly oval, ellipsoid or broadly ovate, 1–4.5 (6) cm long, 0.5–3.5 (4) cm wide, the margins (most) minutely but tightly revolute, upper surfaces glabrous (or sparsely pubescent), lower surfaces most often with a dense covering of short, often **waxy-glandular hairs**, these less commonly sparse (lacking in a rare form) or the surfaces muricate to white-papillose; **petiolules** usually glabrous, not pilose; **petioles** short or virtually lacking except for the sheathing bases on upper cauline leaves, up to 15 cm long and grooved on lower leaves; **stems** branching from the base and above, often stout and up to 1.5 cm in diameter at the base, 0.5–1.4 m tall, from a fibrous, basal **caudex**, 0.5–2.2 cm in diameter, with fibrous **roots**. (2n = ca 134)

Infraspecific Variation: This species is a member of a subtle complex which includes *T. pubescens, T. dasycarpum* and *T. macrostylum*. It remains distinctive so long as the unique waxy hairs are produced, but these are lacking in forma *glabrum* Pennell. The glandular hairs are sometimes replaced by non-glandular hairs which look like the stalks of glands, or the surface may be white-papillose or merely muricate. One could speculate that these are phenotypic responses to the hot, sunny habitats in which the plants grow, but transplant and common-garden studies are needed before this species and its allies are understood.

Importance: This species and *T. dasycarpum* contain Thalicarpine, a substance used in cancer thereapy. Extracts of *T. revolutum* have been shown to contain a number of alkaloids, producing hypotensive effects and showing antimicrobial activity in laboratory animals.





2. *Thalictrum pubescens* Pursh

Common Names: Tall Meadow-rue, Fall Meadow-rue, Muskrat-weed, Late Meadow-rue, King-of-the-meadow

Type Description: Pursh, Flora Amer. Sept., p. 388, 1814

Synonyms: *Thalictrum polygamum* Muhl. *(nomen nudum), T. canadense* L. (misapplied), *T. corynellum* DC., *T. divergens* Link, *T. purpurascens* L. of some authors, *T. canadense* Mill. var. *hebecarpum* (Fern.) House (possible *T. dasycarpum), T. zibellinum* Greene and 13 other combinations by Greene (see Boivin, 1944)

Origin: Eastern North America

Habitats: Moist places, swamps, bog margins, rich, wet woods and thickets, meadows and streambanks

Habit: Tall, erect to ascending perennial herbs

Flowering: June—August

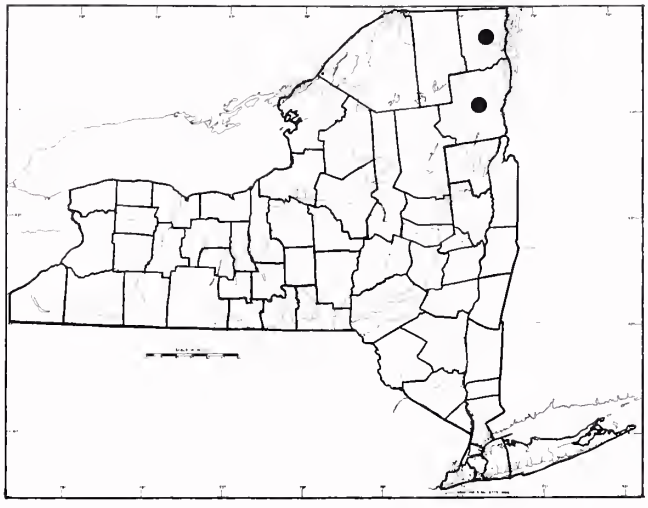
Fruiting: July—October

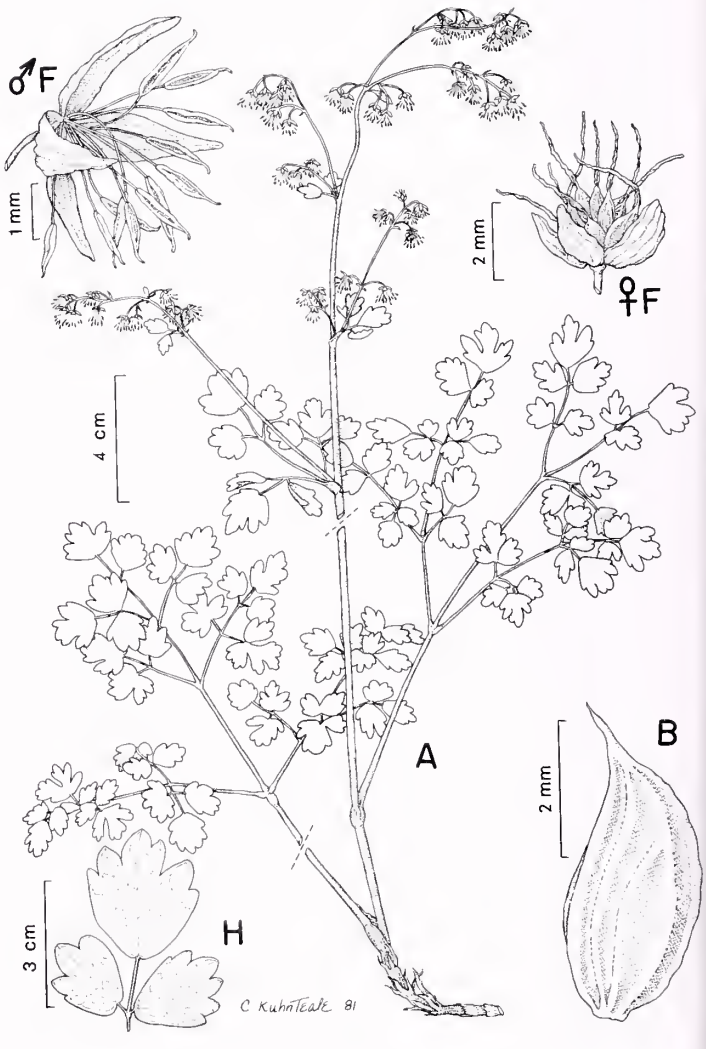
General Distribution: Labrador to Quebec, south, mostly along the Appalachians to North Carolina, west to Indiana

Description: Plants **dioecious** or **polygamo-dioecious**; **stigma** 1 per ovary, 0.5–1.5 mm long becoming up to 2.3 mm in fruit, linear, densely papillose, usually persistent; **style** persistent, short, combined length (with stigma) up to 2.5 mm in fruit; **ovaries** (5) 8–18, fusiform, ribbed, ca 2 mm long, becoming **achenes** 3–5 mm long, 2–3 mm wide, with a few prominent ridges, somewhat falcate-contorted, the surfaces brownish, glabrous or with a fine pubescence; achenes short-stipitate, borne in sub-globose **heads** of 5–18 fruit; **seed** 1 per fruit, shiny brown, ca 2.5 mm in diameter; **stamens** numerous (few in bisexual flowers), 2–6 mm long, pale, showy; **filaments** slenderly to conspicuously dilated toward their summits, clavate, with ridged and minutely scaly surfaces; **anthers** 0.5–1.5 mm long, golden; **perianth parts** 4 (-6), free oval to obovate, entire to slightly erose, with rounded (or apiculate) tips, petaloid, 0.4–3.0 mm long, 0.3–1.8 mm wide, greenish-cream to purplish, early-deciduous; **pedicels** and **peduncles** glabrous or puberulent; **inflorescence** of a series of racemes and panicles in the axils of upper leaflets and bracts, sometimes flat-topped; **bracts** leaf-like, intergrading with leaves below, green, pilose to nearly glabrous; **leaves** 2–3 pinnately compound, sessile and reduced to leaflets on the upper stem, petioled near its base; **leaflets** coriaceous to membranaceous and thin, entire or 2–3 (5) lobed, broadly lanceolate to oval with blunt, rounded or obtuse (apiculate-tipped) lobes, 0.5–7.2 cm long, 0.4–5.9 cm wide, margin usually not revolute, upper surfaces glabrous or sparsely villous, lower surfaces densely to sparsely puberulent or villous to glaucous or slightly papillose (glabrous); **petiolules** densely to sparsely villous (rarely glabrous); **petioles** stout, up to 18 cm long on basal leaves, glabrous to sparsely villous, grooved, sheathing strongly at bases (reduced to sheaths in upper leaves); **stems** branching, stout to slender, up to 2.2 m tall, from a tough, basal **caudex** and fibrous **root system.** (2n = 84, 154)

Infraspecific Variation: This species is extremely closely related to *T. revolutum* and often difficult to distinguish from it. Both are variable in leaf pubescence and may produce glabrous individuals. The variety *intermedium* under *T. polygamum* (Fernald, 1950) is a category devised to take care of intermediates between the species (which we feel may be considered a single taxon after experimental study). Variety *hebecarpum* (Fernald, ibid) has many of the characters of *T. dasycarpum.*

Importance: Thalicarpine, a substance used in cancer therapy, has been isolated from this species as well as from *T. revolutum* and *T. dasycarpum.*





3. ***Thalictrum venulosum* Trel.**

Common Name: Veiny Meadow-rue

Type Description: Trelease, Proc. Bost. Soc. Nat. Hist., vol. 23, p. 302, 1886

Synonyms: *Thalictrum confine* Fern. (in part), *T. campestre* Greene, *T. lunellii* Greene, *T. purpurascens* L. (*sensu* DC.), *T. purpurascens* L. var. *monoicum* DC., *T. dioicum* × *purpurascens* (in Trelease)

Origin: Boreal North America

Habitats: Open, rocky places, shores and forest margins

Habit: Erect, perennial herbs

Flowering: June—July

Fruiting: Late June—September

General Distribution: Labrador to British Columbia, south to Oregon, Colorado, Michigan, Minnesota, New York and Vermont

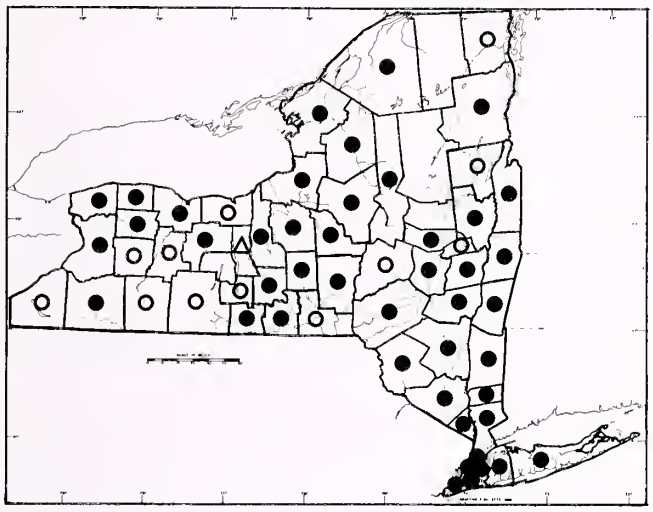
Rarity Status: This species is threatened in New York State (under *T. confine* in pre-1981 publications)

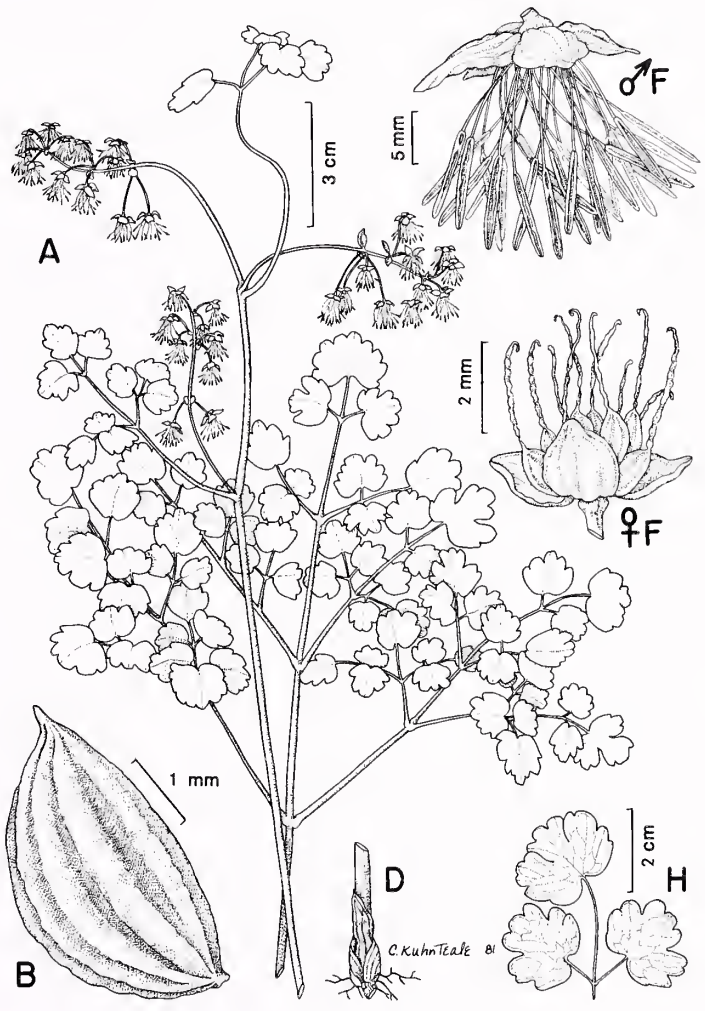
Note: The following description applies only to New York State specimens examined by the senior author. It therefore compares closely with monographic descriptions of *T. venulosum* var. *venulosum*.

Description: Plants **polygamous** or **dioecious; stigma** 1 per ovary, papillose, purplish, persistent, (1.5) 2–3 mm long in fruit; **style** short, 1 per ovary; **ovaries** 4–12 (13), fusiform, ribbed, ca 3 mm long, 1 mm wide, glabrous, becoming bilaterally symmetrical **achenes;** achenes 1–8 (9), brownish, sessile, (3-) 4.5–6.2 mm long, ovoid, falcate-contorted toward the persistent stigma, ribs prominent, branching and sparse, somewhat irregular in pattern; **seed** 1 per fruit, shiny brown, ca 3.5 mm in diameter; **stamens** (3) 4–6 (9) mm long; **filaments** slender-filiform, 1.0–3.5 (6) mm long; **anthers** golden, linear, 2–3.5 mm long with a **subulate tip** 0.2–0.5 mm long; **perianth** parts 4–6, free, pale green to dark purple-green, ovate to lanceolate with acute tips, 2.5–3.5 (4) mm long, 1.0–1.5 (2) mm wide, somewhat scarious (especially in male flowers); **pedicels** and **peduncles** ribbed, purple-green, glabrous; **inflorescence** a panicle of racemose branches, almost naked, with much-reduced bracts and upper leaflets; **upper bracts** minute, sheathing, at the nodes of the inflorescence; **lower bracts** pale, from 2 mm long, lanceolate and scarious grading to lobed leaflets below; **cauline leaves** 2–3 (4) in number in addition to a **basal leaf; leaves**

biternate, triternate or reduced to leaflets subtending the inflorescence, the petiole represented only by a sheath; **lower leaves** petiolate; **leaflets** oval to reniform with (acute) obtuse to truncate bases, (4) 5–12 lobed and crenately toothed, 0.3–2.5 (2.8) cm in diameter, pale green, often glaucous with raised reticulate veins below; **petiolules** and joints often with patches of villous hairs, otherwise glabrous; **petioles** sheathing (often auriculate) at their bases (0) 0.1–15.5 cm long; **stem** glabrous or slightly villous, ribbed, erect, 4–8 dm tall, from an ascending, slender **caudex** which arises from the tip of a cord-like **rhizome; roots** thin, fibrous.

Infraspecific Variation: Lengths and proportions of flower parts, as well as the average fruit and style lengths, vary considerably within this species. Variety *venulosum* is widespread in northwestern North America and has fertile parts smaller in general than those of the rarer eastern "variety *confine*". New York specimens conform more closely with var. *venulosum*.





4. *Thalictrum dioicum* L.

Common Names: Early Meadow-rue, Quicksilver-weed, Shining-grass, "Feathered Columbine"

Type Description: Linnaeus, Species Pl., p. 545, 1753

Synonyms: *Thalictrum laevigatum* Michx., *T. cornuti* of authors not L., *T. pauciflorum* Raf. (and others), *T. pulchellum* Pursh ex Lec., (also varieties, see Boivin, 1944), *Leucocoma dioica* (L.) Nieuwl.

Origin: Eastern North America

Habitats: Rich woodlands, cliffs and clearings, often in moist, rocky places

Habit: Erect, perennial herbs

Flowering: April–May (NY)

Fruiting: May–July

General Distribution: Labrador to North Dakota, south to Missouri and Georgia

Description: Plants **dioecious**; **stigma** 1 per ovary, 1.0–2.5 (3) mm long, somewhat persistent, but deciduous in mature fruit, papillose, purplish when young; **style** almost completely covered by the stigmatic surface; **ovaries** 5–9 (11), fusiform, ribbed, ca 3 mm long, 1 mm wide, glabrous, becoming terete, symmetrical **achenes**; achenes 1–7 (9), brown, sessile, 3.5–5.5 mm long, 1.5–2.5 mm wide, oblong-ovoid to fusiform, densely and evenly parallel-ribbed (with some rib-branching); **seed** 1 per fruit, shiny, brown, ca 3 mm in diameter; **stamens** numerous, 5–7 (9) mm long, drooping; **filaments** slender-filiform, yellow, 2–5 mm long; **anthers** golden, linear, 1.3–3.8 (4.1) mm long, without prominent subulate tips; **perianth parts** 4 (−6), free; in male flowers: 1.2–2.0 mm long, ovate to

elliptic, with obtuse to rounded tips, purple-green; in female flowers: 2.5–4.2 mm long, broadly oval to obovate with rounded tips, pale, creamy-green to purple-tinged; **pedicels** and **peduncles** ribbed, glabrous; **inflorescence** an open panicle, developing with the leaves in spring, usually subtended by a petioled leaf (less frequently by 1–3 leaflets); **bracts** sheathing, scarious and leaflet-like, pale to purple-stained; **leaves** 2–4 ternately and pinnately compound, all usually petioled; **cauline leaves** 1–3 (4) in addition to a **basal leaf; leaflets** oval to reniform, with acute to truncate or slightly cordate bases (4) 5–15 lobed, with sharp to broadly crenate **lobes** (teeth), (leaflets) 0.3–3.2 (4.8) cm in diameter, glabrous, sometimes glaucous, without prominent veins below, pale gray-green to purplish (especially when young); **petioles** stout, glabrous, 1–20 cm long, ribbed, strongly sheathing at their bases (often auriculate); **stems** glabrous, ribbed, up to 1 m tall, from a stout, erect **caudex** 0.3–1.1 cm in diameter; **rhizome** (if present) laterally connecting the erect caudices; **roots** tough, fibrous. (2n = 42)

Importance: This species is sometimes grown in shady garden locations and along borders for its purplish, early foliage which looks much like Columbine.

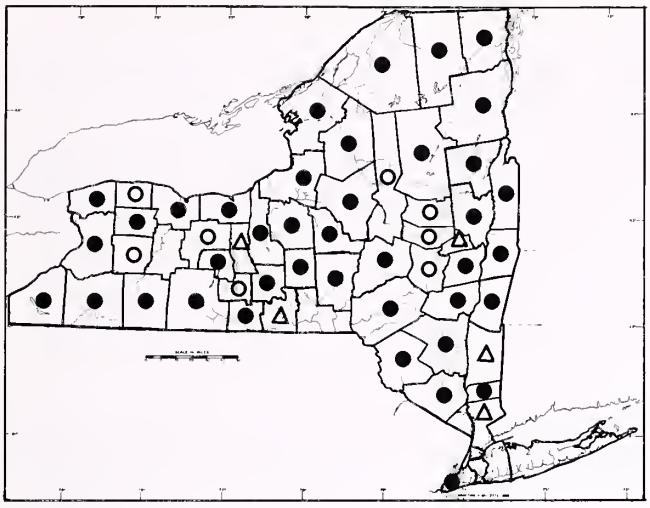
Waifs: *Thalictrum aquilegiafolium* L. has been collected at the border of woods in Bronx Park.

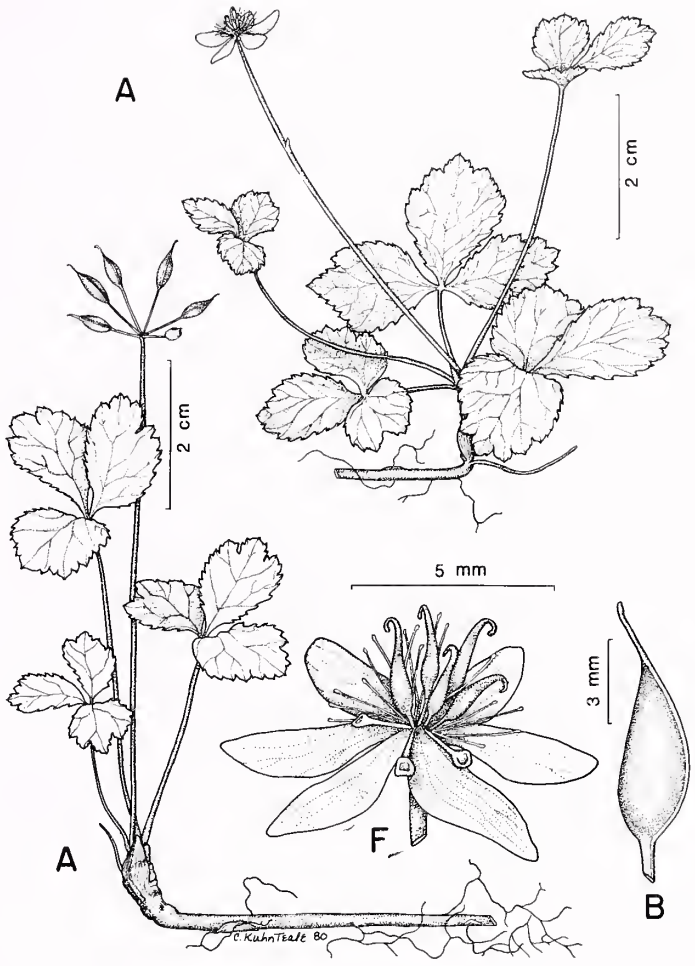
18. COPTIS

Common Names: Goldthread, Canker-root

Authority: Linnaeus, Species Pl., p. 558, 1753

A genus of about 10 north-temperate and arctic species. Our native species is the only one in the northeast United States; however, it ranges to Asia and has relatives in the western states and Alaska, such as *Coptis laciniata* Gray and *C. aspleniifolia* Salisb. The plants have been used medicinally and grown ornamentally.





1. ***Coptis trifolia*** (L.) Salisb.

Common Names: Goldthread, Canker-root, Goldenthread

Type Description: Linnaeus, Species Pl., p. 558, 1753

Synonyms: *Helleborus trifolius* L., *Coptis groenlandica* (Oed.) Fern., *C. trifolia* var. *groenlandica* (Oed.) Fass., *C. trifolia* ssp. *groenlandica* (Oed.) Hult., *Anemone groenlandica* Oed., *Helleborus pumilus* Salisb., *Chrysa borealis* Raf., *Isopyrum trifolium* (L.) Britt.

Origin: Ancient Arctotertiary Forest

Habitats: Wet woods, bogs, swamps, mossy places and rotting logs

Habit: Scapose, rhizomatous, perennial herbs

Flowering: April–May

Fruiting: May–September

General Distribution: Eastern U. S. and Canada, south to the Appalachians, scattered to western Canada, Alaska, Japan and Siberia

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, linear, on the abaxial surface of the slightly curved **style;** style 1.5–2.0 mm long; **ovaries** 3–9, free, 1.5–2.0 mm long, each on a 2 mm stipe, becoming a 4–8 seeded **follicle;** follicles fusiform, smooth, keeled on the abaxial side, 5–9 mm long, each borne on a 4–8 mm **stipe** and beaked by the **persistent style** (2.5–4.0 mm), hooked in the area of the stigma; **seeds** ellipsoid, shiny, red-brown, ca 1 mm long; **stamens** about 20–30, 3–4 mm long, in a spiral; **filaments** thread-like; **anthers** globose, ca 0.5 mm long; **staminodia** 5–7, clavate-spatulate, 2.5–3.0 mm long, each with a nectary borne in its expanded, connate tip; **petals** absent (or represented by the staminodia); **sepals** 5–7, petaloid, white, 5–9 mm long, 1–4 mm broad, spatulate, oblanceolate or elliptic-lanceolate, the apex acute to obtuse or rounded, the base gradually narrowed (clawed in the west and Asia); **scapes** one to several per plant, 4–11 cm tall, slender, glabrous, each with a **single flower** and usually with a lanceolate **scale** ca 1.5 mm long, 1–3 cm below the flower; **leaves** basal, ternately compound; **leaflets** 8–28 mm broad evergreen, lustrous, dark green above, with a few simple hairs along the veins of the paler under surfaces, cuneate-obovate, sharply toothed, often with slightly cut or lobed margins, sometimes obscurely ternate; **petiolules** up to 1 mm long; **petioles** 3–11 cm long, glabrous except for some hairs at the juncture of the blade, caniculate-sheathing at the base, enclosing a golden, mitre-like **bud** with one simple and one bifid lobe; **stipules** sheathing, chartaceous, brown, the older ones subtending the remains of previous years growth; **stems** short, often subterrainian caudices which develop at intervals along slender, golden-yellow **rhizomes;** rhizomes with **scales** at intervals, each of which accompanies a filiform **root.** (2n = 18)

Infraspecific Variation: Because the sepals are gradually narrowed at the base rather than attenuated into a claw, the eastern Canadian and U. S. plants have been called a subspecies, variety or full species with the epithet *groenlandica*.

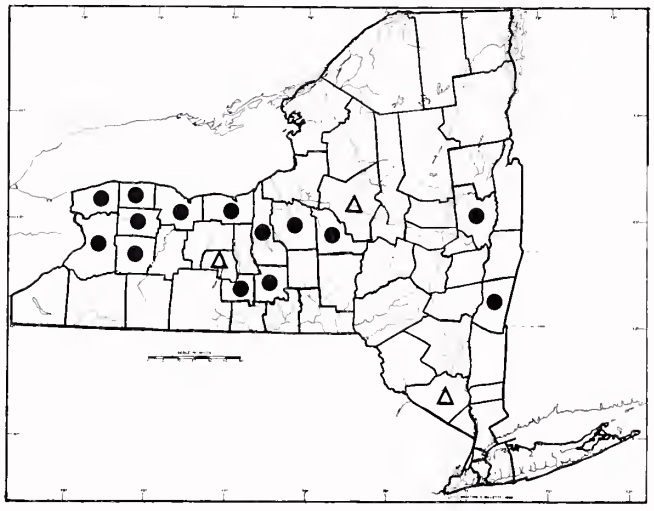
Importance: The rhizomes and roots contain Berberine, and have been used in bitter tonics to promote digestion, aid dyspepsia and strengthen the viscera. In New England the extract has been applied externally to combat thrush, the childhood disease.

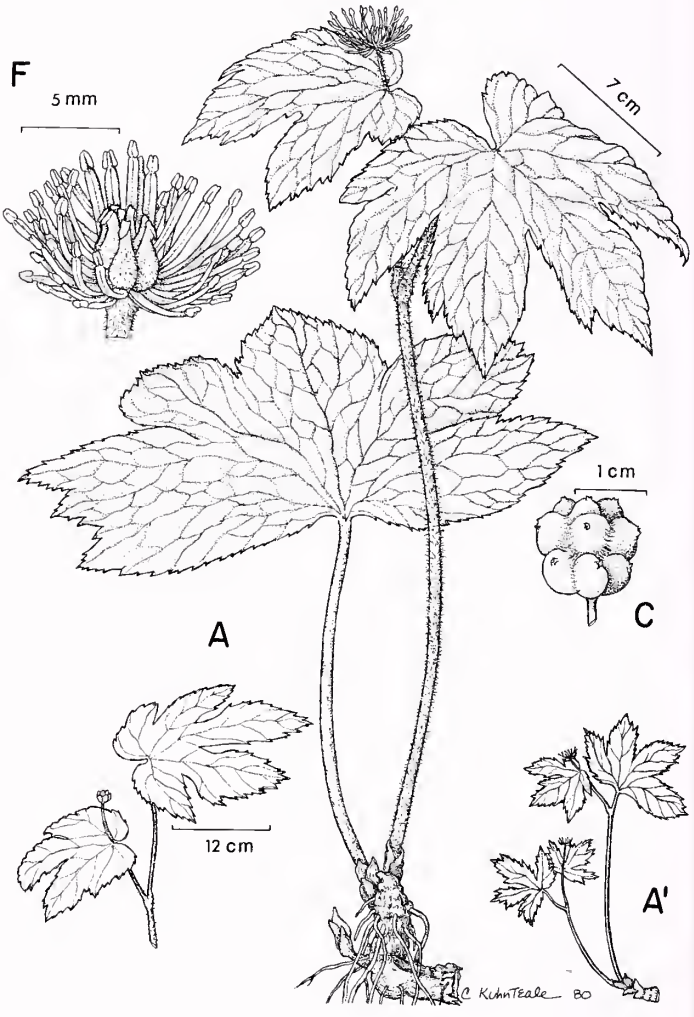
19. HYDRASTIS

Common Names: Golden-seal, Orangeroot, Yellow Puccoon

Authority: Ellis, in Linnaeus, Syst. ed. 10, p. 1088, 1759

A genus of two species, one from eastern U. S. and southern Canada, and the other from Asia, showing the classic pattern of Arctotertiary disjunction, *Hydrastis* is exploited for the roots which are used in the pharmaceutical trade.





1. *Hydrastis canadensis* L.

Common Names: Golden-seal, Orangeroot, Yellow Puccoon, "Turmeric"

Type Description: Linnaeus, Syst. ed. 10, p. 1088, 1759

Synonyms: *Warnera canadensis* (L.) Mill., *W. diphylla* Raf., *W. tinctoria* Raf.

Origin: Ancient, Arctotertiary Forest

Habitats: Rich woodlands, often in humus

Habit: Erect, perennial herbs

Flowering: April–May

Fruiting: June–August

General Distribution: Vermont to Minnesota and Nebraska, south to Arkansas and Georgia (much-depleted throughout; extirpated in Kansas)

Rarity Status: Listed by the Smithsonian Institute as threatened; commercially vulnerable

Description: Plants with **bisexual** flowers; **stigma** 1 per ovary, flat, 2-lobed; **style** 1 per ovary, short; **ovaries** 5–12 (15) per flower, ca 3 mm long, spindle-shaped, with hispid bases, each bearing two **ovules;** each ovary becoming an oblong crimson to dark red **berry;** berries borne in a dense, fused **head,** 0.8–2.1 cm in diameter, each berry 5–8 mm long; **seeds** 1–2 per berry, shiny, ebony at maturity 2.5–4.5 mm long, with flattened sides and a small keel; **stamens** 4–8 mm long, with linear to inflated, creamy **filaments;** these giving the main color to the **flower; perianth** parts early-deciduous, 3 in number, pale, in a single whorl and inconspicuous when present; **flower** one per shoot 1.0–1.8 cm wide, on a densely hispid **peduncle** which arises at the base of a sessile leaf; **leaves** usually 3 per individual stem, morphologically similar, but each different in its disposition; **sessile cauline leaf** subtending the peduncle (which is merely a continuation of the stem), 3–5 palmately lobed and veined, with large and small, irregular dentations, densely pilose-hispid throughout when young, mostly remaining so at maturity, especially along major veins, (leaf) 2–7 cm in diameter at anthesis, becoming up to 15 cm wide at maturity, but consistently smaller than petioled leaves; **petioled cauline leaf** like the sessile one, but larger, becoming 12–20 cm wide at maturity; **cauline leaf petiole** 0.5–9.5 cm long, hispid, clasping at base; **basal leaf** like the cauline ones, but larger, reaching 26 cm in diameter at maximum; **basal leaf petiole** 5–28 cm long, often extending its leaf to the level of the cauline ones; **stem** fluted, pilose when young, becoming virtually glabrous with age, up to 36 cm in height; 1-several clasping, translucent **scales** subtend the stem where it joins the **rhizome** at ground level; **rhizome** yellowish, knotty-tuberous, clumped, with tough, fibrous **roots.** (2n = 26)

Infraspecific Variation: The basal leaf is sometimes absent; occasionally a second, smaller shoot with two cauline leaves and a flower arises from the point where the basal leaf would be expected.

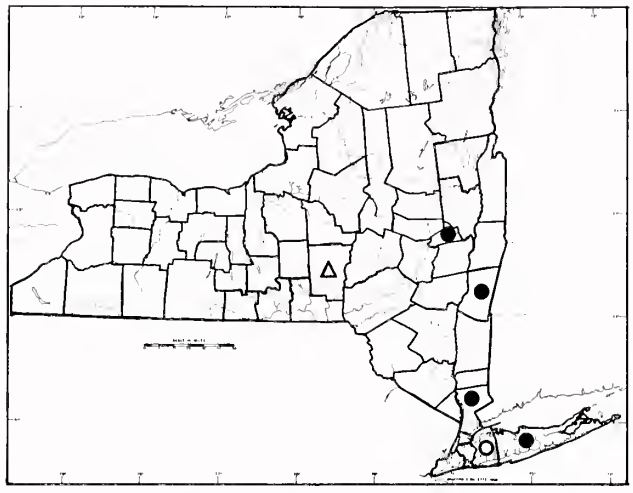
Importance: The powdered rhizome has been used in commercial preparations for gastrointestinal inflammation and hemorrhoids. Its collection for this purpose is undoubtedly a major factor in the plant's present rarity, as it was once more common under moderately shady, forest conditions. Settlers in the eastern U. S. found the native people using tonic made from the rhizome for stomach and liver ailments, sore eyes and as a yellow dye for their faces. The product did not become an article of commerce until the 1850s, but has since been listed as: treatment for inflamed mucous membranes (Catarrh), antibiotic against protozoa and broad-spectrum bacteria, laxative, hemostatic, alterative, astringent and detergent. The major active antibiotic ingredient is the 3.5–4% Berberine (Hydrastine), an alkaloid known from other plants as well; rhizomes also contain Canadine, resins, starch, sugar, fats and a volatile oil which gives them a characteristic odor. Golden-seal is not easily cultivated, and the rhizomes lose much weight in drying; these factors contribute to the soaring price per pound in recent years. Remaining populations are severely threatened and require management, or the species will surely become endangered.

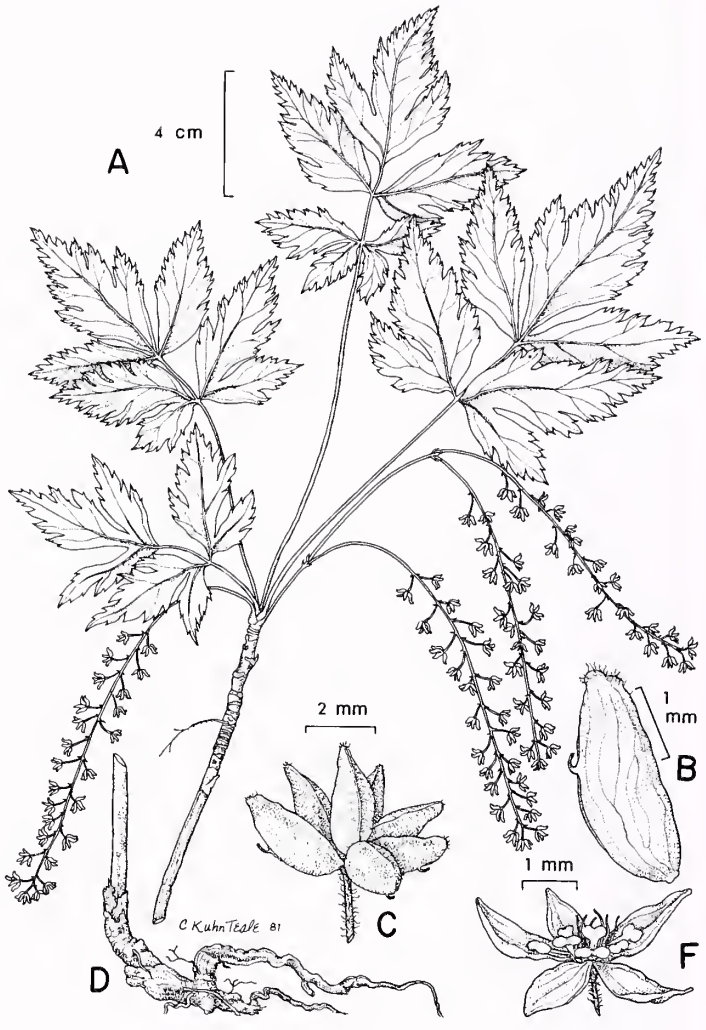
20. XANTHORHIZA

Common Name: Yellowroot

Authority: Marsh., Arb. Amer., p. 168, 1785.

A genus with a single species, endemic to the Appalachians of the southeastern United States with outlying populations in Florida and Pennsylvania. It is an escape from cultivation in the midwest and northward to New York State and Connecticut. It was reported as native to New York in the early 19th century but no specimen has been found.





1. *Xanthorhiza simplicissima* Marsh.

Common Names: Yellowroot, Yellow-wood, Shrub Yellowroot

Type Description: Marsh., Arb. Amer., p. 168, 1785

Synonyms: *Zanthorhiza apiifolia* L'Her

Origin: North America; early Arctotertiary

Habitats: Woods, thickets and moist ravines; escaping cultivation near nurseries

Habit: Erect, perennial subshrubs

Flowering: April–May

Fruiting: May–July

General Distribution: Southern Pennsylvania, along the Appalachians to Alabama (western Florida). Reported native to Chenango Co., N. Y. (Torrey Flora), now known as an escape, Columbia Co. and northern Long Island

Description: Plants with **bisexual** flowers or **polygamous**; **stigma** 1 per ovary, at the tip of slender, recurved **style** ca 0.5 mm long; **ovaries** 5–9 (15), free, about 0.5 mm long, teardrop shaped, each with 2 pendulous **ovules**, one of which often aborts; each **ovary** becoming an inflated **follicle** in fruit; follicles 5–10 in a loose cluster, pale brown, each 4–6 mm long, obliquely oblong, the adaxial side with a pubescent suture which extends around the **saccate terminal lobe** to the **persistent style** on the abaxial side; **style** recurved, tail-like, apparently serving as a stop for the suture upon dehiscence; **seed** 1 (rarely 2) per follicle, distal; **stamens** 5 (10), 4-celled, with short, attenuated **filaments**, interior to 5 larger **staminodes**; staminodes 2-lobed, nectariferous, on flattened stalks, alternating with perianth lobes; **perianth** of 5 free **sepals** which are attenuated at the bases and have acute tips, reddish to purple-brown with yellow tinges, each one 2–3 mm long, making the flower 6–7 mm in diameter; **pedicels** 2–4 mm long, villous; **inflorescences** numerous simple to compound racemes, 3–12 (16) cm long, drooping and spreading on slender, villous axes, each bearing 15–35 flowers or more; **bracts** linear-lanceolate, about 1 mm long; **leaves** pinnately compound; **leaflets** 5 (7), ovate (often distorted), attenuated at bases, variously cut and toothed, the lower 2 often incised to near their bases, 5–9 cm long at maturity, puberulent along the veins; **petioles** 5–15 cm long at maturity, sparsely villous; **bud scales** leathery, oblong, puberulent and reflexing, much like those of *Sassafras*, enclosing both inflorescences and leaves which appear together in spring; **leaf scars** irregular; **bud scars** prominent, ringing the stem; **bark** reddish-yellow to brown, peeling readily, revealing the **yellow wood**; **stem** tough, woody, up to 5 dm tall, from a fibrous, yellow **rootstock**. (2n = 36)

Importance: An extract of the bitter, yellow root was used by Catawba Indians and early settlers as a treatment for ulcerated stomach and other gastrointestinal disorders, as well as for sore throats and colds. Roots were also used by Indians as a source of yellow dye. Plants are cultivated as a ground cover, and readily escape in suitable climates to form extensive colonies.

APPENDIX I

FUNGI ASSOCIATED WITH PLANT SPECIES IN THIS TREATMENT

To be included on this list, a fungus must occur on a species in this treatment somewhere in the United States. If a fungus occurs in New York State and has not as yet been recorded on a host covered in this treatment, but has been collected on such a host in some other state, it is marked with a single asterisk (*).

Abbreviations of states indicate a literature citation for each. Double asterisks (**) indicate that a herbarium specimen with New York State host information has been seen.

CHYTRIDIALES

Physoderma sp., on *Ranunculus acris* (Mich.)

Synchytrium anemones (DC. ex Fries) Woron., on *Anemone cylindrica* (Iowa, Minn.), on *Anemone quinquefolia* (Del., Iowa, Mass., Mich., N.Y.**, Vt., Wisc.), on *Anemone virginiana* (Vt.)

Synchytrium aureum Schröt. *, on *Caltha palustris* (Wisc.), on *Ranunculus repens* (Ill.)

Synchytrium cinnamomeum J. J. Davis, on *Ranunculus hispidus* var. *caricetorum* (Wisc.), on *Ranunculus* sp. (Wisc.)

PERONOSPORALES

Peronospora hiemalis Gäum. (= *Peronospora ficariae* Tul. ex de Bary in part), on *Ranunculus acris* (Mass., N.Y.**)

Peronospora pensylvanica Gäum (=*Peronospora ficariae* Tul. ex de Bary in part), on *Ranunuculus pensylvanica* (N.Y.**)

Peronospora ranunculi Gäum. (= *Peronospora ficariae* Tul. ex de Bary in part), on *Ranunculus acris* **, on *Ranunculus bulbosus* (Mass.), on *Ranunculus pensylvanicus* **, on *Ranunculus repens*** (Mich.)

Phytopthora thalictri G. Wils. & J. J. Davis, on *Thalictrum dasycarpum* Wisc., on *Thalictrum pubescens* (Conn., N.Y., Wisc.)

Plasmopara pygmaea (Unger) Schröt., on *Aconitum* sp. (Alaska), on *Anemone canadensis (N.Y.** to Ill., N. Dak.), on *Anemone quinquefolia* **(Mass. to Ill., Wisc.), on *Anemone virginiana* (Ill., N.Y.**, Wisc.) on *Hepatica nobilis* (Iowa, Wisc.), on *Hepatica nobilis* var. *acuta* **, on *Hepatica nobilis* var *obtusa* **

Plasmorpara pygmaea (Unger) Schröt. var. *fusca* (Peck) J. J. Davis, on *Hepatica nobilis* (N.Y., Wisc.)

Pythium aphanidermatum (Edson) Fitzp., on *Consolida ambigua* (Va.)

Pythium ultimum Trow, on *Consolida ambigua* (Calif., N.Y.)

ERYSIPHALES

Erysiphe aquilegiae DC. ex Mérat, on *Thalictrum* sp. (Minn.)

Erysiphe polygoni DC., on *Aconitum* sp. (N.Y., Tex., W. Va.), on *Anemone canadensis* (Ill., Iowa, N.J., N.Y.**, N. Dak.. Wisc.), on *Anemone virginiana* (Iowa, Mich., Minn.), on *Anemonella thalictroides* (Iowa), on *Aquilegia canadensis* (Ill., Ind., Iowa, N.Y., Ohio, Pa., Wisc.), on *Aquilegia vulgaris* (N.J.), on *Caltha palustris* (Mich., N.Y.**, Ohio, Wisc.), on *Clematis virginiana* (Maine to Ga.), on *Consolida ambigua* (Calif.), on *Ranunculus abortivus* **, on *Ranunculus acris* **, *Ranunculus flabellaris* and *Ranunculus repens* (eastern and central U. S.), on *Thalictrum dasycarpum* and *Thalictrum pubescens* ** (eastern and central U.S.)

Sphaerotheca humuli (DC.) Burr., on *Consolida ambigua* (Calif.)

SPHAERIALES

Diaporthe arctii (Lasch) Nits., on *Consolida ambigua* (Md., N. C., N. Y., Ohio, Pa.)

Leptospheria vagabunda Sacc., on *Clematis virginiana* (N.Y.**)

Leptospheria sp., [near *Leptospheria ogiliviensis* (Berk. & Br.) Ces. & de Not (= *Ophiobolus subolivaceus* Peck)], on *Thalictrum pubescens*

HELOTIALES

Helotium scutula (Pers. ex Fries) Karst., on *Thalictrum* sp. (Minn.)

Leptotrochila ranunculi (Fries) Schuepp [= *Fabraea ranunculi* (Fries) Karst.], on *Ranunculus acris* (N.Y.), on *Ranunculus hispidus* var. *caricetorum* (Wisc.), on *Ranunculus* sp. (N.Y., Wisc.)

Mollisiopsis subcinerea Rehm, on dead stems of *Thalictrum* sp. (N.Y.)

Pseudopeziza calthae (Phillips) Massee (= *Fabraea rousseauana* Sacc. & Bomm.), on *Caltha palustris* (Wisc.)

Pseudopeziza singularis (Peck) Davis, on living leaves of *Ranunculus* sp. (N.Y.)

Pyrenopeziza thalictri (Peck) Sacc., on overwintered stems of *Thalictrum* sp. (N.Y. **)

Sclerotinia sclerotiorum (Libert) de Bary, on *Aconitum* sp. (Colo.), on *Aquilegia vulgaris* (Del., Ohio, Pa.) on *Consolida ambigua* (Mo., Tex.)

PLEOSPORALES

Physalospora obtusa (Schw.) Cooke (= *Botryosphaeria* ?, *Sphaeropsis clematidis* Dearn. & House, *Sphaeropsis malorum* Peck non Berk., *Sphaeropsis punctata* Dearn. & House, *Sphaeropsis seriata* Peck), on *Clematis* sp. (N.Y.)

DOTHIDEALES

Mycosphaerella coptis (Schw.) House [= *Sphaeria coptis* Schw., *Sphaerella coptis* (Schw.) Farlow, *Laestadia coptis* (Schw.) Ellis & Everh.], on *Coptis trifolia* (Maine, N.Y., Vt.)

Mycosphaerella hypsicola (Ellis & Everh.) Lindau, *Trollius laxus* (Colo.)

Mycosphaerella punctata Dearn. & House, *Thalictrum pubescens* **

Mycosphaerella ranunculi (Karst.) Lindau, *Ranunculus* sp. (N.H.)

Mycosphaerella thalictri (Ellis & Everh.) Lindau, on *Thalictrum dasycarpum* (Iowa, Wisc.), on *Thalictrum dioicum* (Iowa, N.J., N.Y., Vt.), on *Thalictrum pubescens* (Iowa, N.Y.**, Wisc.), on *Thalictrum* sp. (Iowa, Pa.)

USTILAGINALES

Doassansia ranunculina J. J. Davis, on *Ranunculus flabellaris* (Ind., Md., Wisc.)

Entyloma ficariae (Cornu & Roze) Fisch. v. Waldh. [= *Entyloma ranunculi* (Bonord.) Schröt.], on *Anemone quinquefolia* (Wisc.), on *Ranunculus flabellaris* (Ind.), on *Ranunculus pensylvanicus* (Wisc.), on *Ranunculus repens* (Va.), on *Ranunculus hispidus* var. *caricetorum* (Maine), on *Thalictrum dasycarpum* (Ill., Wisc.)

Entyloma microsporum (Unger) Schröt., on *Ranunculus fascicularis* (Wisc.), on *Ranunculus hispidus* var. *caricetorum* (Ill., Iowa, Maine, N.Y.**, Wisc.), on *Ranunculus hispidus* var. *nitidus* (Ind.), on *Ranunculus pensylvanicus* (Wisc.)

Entyloma thalictri Schröt., on *Thalictrum dasycarpum* (Ill., Wisc.), on *Thalictrum dioicum* (Ind., Wisc.), on *Thalictrum pubescens* (Conn., N.H.), on *Thalictrum revolutum* (N.Y.)

Urocystis anemones (Pers.) Wint., on *Anemone canadensis* (Minn., N. Y., Wisc.), on *Anemone cylindrica* (Colo.), on *Anemone quinquefolia* ** (Maine to Del., Iowa, Mich., Minn., Wisc.), on *Anemone virginiana* (Ind., Iowa, N. Y. **, Tex.), on *Anemone virginiana* var. *alba* (N. Y.), on *Anemonella thalictroides* (Iowa, Minn., N. Y. **), on *Hepatica nobilis* var. *acuta* (Ill., Ind., Iowa, Maine, Minn., N. Y. **, Ohio, Pa., Wisc.), on *Hepatica nobilis* var. *obtusa* (N. Y. **, Va.), on *Ranunculus hispidus* var. *caricetorum* (Mo.), on *Trollius laxus* (N. Y.)

Urocystis carcinodes (Berk. & Curtis) Fisch. v. Waldh., on *Aconitum* sp. (Utah), on *Actaea pachypoda* (Pa., W. Va.), on *Actaea spicata* ssp. *rubra* (Idaho, Utah), on *Cimicifuga racemosa* (N. C., N. Y. **, Ohio, Pa., Tenn., Va.)

Urocystis sorosporioides Körn., on *Aconitum* sp. (Utah), on *Anemonella thalictroides* (Iowa, N. Y.), on *Thalictrum dasycarpum* (Mass.), on *Thalictrum pubescens* (N. Y. **), on *Thalictrum revolutum* (Mass., N. Y. **)

UREDINALES

Puccinia andina Diet. & Neger, (III) on *Ranunculus hispidus* var. *caricetorum*, (III.) on *Ranunculus hispidus* var. *nitidus* (Ind., N. Y. **)

Puccinia anemones-virginianae Schw., (III) on *Anemone canadensis* (Iowa, Mich., N. Y.), on *Anemone cylindrica* ** (Maine to Miss., Okla., N. Dak.), on *Anemone virginica* ** (Vt. to N. D., N. C. to Mo.), on *Anemone virginiana* var. *alba* (Maine, Vt.)

Puccinia calthae (Grev.) Link, (0, I, II, III) on *Caltha palustris* (Ind., Iowa, Mich., N. J., N. Y. **, N. D., S. D., Wash., Wisc.)

Puccinia calthaecola Schröt., (0, I, II, III) on *Caltha palustris* (Iowa, Mich., Minn., N. Y., Wisc.)

Puccinia eatoniae Arth. var. *ranunculi* Mains, (0, I) on *Ranunculus abortivus* (Conn., Del., Ill., Ind., Iowa, Mich., Miss., Mo., N. Y. ** , N. C., N. D., Ohio, Pa., S. C., S. D., W. Va., Wisc.), on *Ranunculus allegheniensis* ***, on *Ranunculus micranthus* (W. Va.)

Puccinia gigantispora Bubák, (0, I, III) on *Anemone cylindrica*, *Anemone multifida* (Colo., Ill., N. Dak., Wisc.)

Puccinia magnusiana Körn., (0, I) on *Anemone canadensis* (Iowa, Kans., Nebr., N. Y., N. D., S. D., Wisc.). II and III on *Phragmites australis.*

Puccinia recondita Roberge ex Desm. [= *Puccinia rubigo-vera* (DC.) Wint.] 0, I on Ranunculaceous hosts — II, III on various grasses. on *Aconitum* (Alaska, Colo.), *Actaea pachypoda* **, *Actaea spicata* ssp. *rubra* (N. Y. ** to Va., Ill., Minn.), on *Anemone canadensis* **, *Anemone cylindrica* **, *Anemone quinquefolia* **, *Anemone virginiana* (N. Y. ** to Tex., Colo., Mont.), on *Anemonella thalictroides* (Ind., Iowa, Mo.), *Cimicifuga racemosa* **, *Clematis virginiana* ** (eastern U. S.): on *Ranunculus acris*, *Ranunculus cymbalaria*, *Ranunculus hispidus* var. *caricetorum* **, *Ranunculus repens* (Wisc., to Tex., Calif., Wash., Alaska); on *Thalictrum dasycarpum*, *Thalictrum dioicum* **, *Thalictrum pubescens* **, *Thalictrum revolutum* ** (N.E. and N. central U. S.)

Tranzschelia anemones (Pers.) Nannf. ex Lundell & Nannf. [= *Tranzschelia fusca* (Pers.) Wint., *Tranzschelia suffusca* (Holw.) Ruth]. 0, III on *Anemone quinquefolia* ** (Mass. to Va., Ill., Minn.), on *Thalictrum pubescens* **

Tranzschelia pruni-spinosae (Pers.) Diet., (0, I on ranunculaceous hosts — II, III on *Prunus.*), on *Anemone quinquefolia* ** (Vt. to Ala., Iowa, Wisc.), on *Hepatica nobilis* ** (Mass. to Md., Minn., and Tex.), on *Thalictrum dasycarpum* (Colo, Iowa, Kans., N. Dak. Nebr., S. Dak.), on *Thalictrum pubescens* (Ohio)

Tranzschelia thalictri (Chev.) Diet., 0, III on *Thalictrum dasycarpum*, *Thalictrum dioicum* **, *Thalictrum pubescens* **, *Thalictrum revolutum* ** (Eastern & Central U. S.)

Uromyces dactylidis Otth, 0, I on *Ranunculus repens* (Mass.)

Uromyces lycoctoni (Kalchbr.) Trotter, 0, I, II, III on *Aconitum* sp. (Calif., Colo., Tex., Utah, Wyo.)

TULASNELLALES

Ceratobasidium anceps (Bres. & Syd.) H. Jacks., on *Ranunculus hispidus* var. *caricetorum* (Wisc.)

MONILIALES

Alternaria sp., on *Hydrastis canadensis* (Mich., N. Y., Ohio), on *Aconitum noveboracense* **

Botrytis cinerea Pers. ex Fries, on *Aconitum noveboracense* **, on *Aquilegia vulgaris* (Va.), on *Consolida ambigua* (N. Y.), on *Ranunculus* sp. (N. Y., Wisc.)

Botrytis sp., on *Hydrastis canadensis* (Conn. to N. C., Ind.)

Cercospora aquilegiae Kellerm. & Swing., on *Aquilegia canadensis* (Kans.), on *Aquilegia vulgaris* (Kans.)

Cercospora calthae Peck & G. W. Clinton, a name of unknown origin on *Caltha palustris* (Wisc.)

Cercospora caulophyli Peck, on *Anemonella thalictroides* Mo.

Cercospora filiformis J. J. Davis, on *Thalictrum dasycarpum* (Wisc.)

Cercospora fingens J. J. Davis, on *Thalictrum dasycarpum* (Wisc.), on *Thalictrum dioicum* (Wisc.), on *Thalictrum* sp. (Ill.)

Cercospora ranunculi Ellis & Holw., on *Ranunculus hispidus* var. *caricetorum* (Wisc.), on *Ranunculus repens* (Wisc.)

Cercospora squalidula Peck, on *Clematis virginiana* (Ala., La., Mass., N. C., Nebr., N. Y. **, Wisc.)

Didymaria didyma (Unger) Pound, on *Anemone canadensis* (Iowa, Mich., Wisc.), on *Anemone cylindrica* (Iowa, Mich., Wisc.), on *Anemone virginiana* (Iowa, Mich., Wisc.), on *Ranunculus abortivus* **, on *Ranunculus acris* ** (Wisc.), on *Ranunculus hispidus* var. *caricetorum* (Ind., Iowa, Mich., N. Y. **, Wisc.), on *Ranunculus hispidus* var. *nitidus* (Miss.), on *Ranunculus repens* (Ill., Mass., Wisc.)

Ectostroma afflatum (Schw.) Fries, on *Cimicifuga racemosa* (Va.)

Fusarium sp., on *Hydrastis canadensis* (Ill., N. Y., Ohio, Wash.)

Ovularia decipiens Sacc., on *Ranunculus acris* N. Y. **, on *Ranunculus repens* (Tex.), on *Ranunculus* sp. (N. Y.)

Phymatotrichum omnivorum (Shear) Dug., on *Aconitum* sp. (Tex.), on *Aquilegia canadensis* (Tex.), on *Consolida ambigua* (Tex.), on *Hydrastis canadensis* (Tex.), on *Ranunculus repens* (Tex.)

Ramularia actaeae Ellis & Hollw., on *Actaea pachypoda* (Iowa, Vt.), on *Actaea spicata* ssp. *rubra* (Colo., N. M., Wisc.)

Ramularia aequivoca (Ces.) Sacc. (= *Ramularia gibba* Fuckel), on *Ranunculus abortivus* (Wisc.), on *Ranunculus hispidus* var. *caricetorum* (Ill., Iowa, Wisc.), on *Ranunculus repens* (Ill., Iowa, Wisc.), on *Ranunculus* sp. (Ill., Iowa, Wisc.) Conidial state of *Stigmatea ranunculi* Fries

Ramularia calthae Liro, on *Caltha palustris* (N. Y. **, Wisc.)

Ramularia ranunculi Peck, on *Anemone canadensis* N. Y. **, on *Anemone cylindrica* (Wisc.), on *Ranunculus acris* (Maine, N. Y. **, Vt.), on *Ranunculus hispidus* var. *caricetorum* **, on *Ranunculus hispidus* var. *nitidus* (Ind., Miss.), on *Ranunculus recurvatus* **, on *Ranunculus* sp. (Ind., Iowa, Md., N. Y., Vt.)

Septocylindrium ranunculi Peck, on *Ranunculus abortivus* **, on *Ranunculus abortivus* var. *eucyclus* **, on *Ranunculus acris* (N. Y.), on *Ranunculus* sp. (Ill., N. Y., Wisc.)

Stemphylium lancipes (Ellis & Everh.) Simmons (= *Alternaria lancipes* Ellis & Everh.), on *Aquilegia* sp. (Kans.)

Verticillium albo-atrum Reinke & Berth., on *Aconitum* sp. (Mass., N. J., N. Y., Ohio), on *Consolida ambigua* (N. Y.)

SPHAEROPSIDALES

Ascochyta actaeae (Bres.) J. J. Davis [= *Actinonema actaeae* Allesch, *Marssonina actaeae* (Bres.) Magn.], on *Actaea spicata* ssp. *rubra* (Wisc.), on *Cimicifuga racemosa* (Conn., N. Y.)

Ascochyta aquilegiae (Rabenh.) Höhn [= *Marssonia aquilegiae* Rabenh.) Lind, *Phyllosticta aquilegiae* Roum. & Pat, *Actinonema aquilegiae* Grove, *Phyllosticta aquilegiae* Tehon & Daniels], on *Aquilegia canadensis* (Ill., Wisc.), on *Aquilegia vulgaris* (Conn., Iowa, Md., N. J., N. Y., Pa., Wisc.)

Ascochyta clematidina Thüm. forma *thalictri* J. J. Davis, on *Thalictrum dasycarpum* (WISC.), on *Thalictrum dioicum* (Wisc.)

Ascochyta clematidina Thüm ex Gloyer, on *Clematis virginiana* (Miss., N. J., N. Y. **, Ohio, W. Va., Wisc.)

Ascochyta infuscans Ellis & Everh., on *Ranunculus* sp. (Wisc.), on cultivated *Trollius* sp. (N. Y.)

Coniothyrium hellebori Cooke & Massee, on cultivated *Helleborus* sp. (Md., N. C., N. Y., Oreg.)

Diplodia herbarum Lév., on *Thalictrum pubescens* **

Diplodia hortensis Sacc., on *Clematis* sp. (Mich., N. Y.)

Diplodia thalictri Ellis & Dearn., on *Thalictrum pubescens* **

Diplodia thalictroides (Syd.) Allesch., on *Clematis* sp. (Mich., N. Y.)

Diplodina delphinii Laskaris, on *Consolida ambigua* (Calif.)

Hendersonia hortilecta Fairm., on *Clematis* sp. (N. Y.)

Phleospora anemones Ellis & Kellerm. (See *Septoria punicea–Sphaeropsidales*)

Phoma anemone C. Kauffm., on *Anemone virginiana* (Fla.)

Phoma spermoides Dearn., on *Thalictrum pubescens* (N. Y.) on *Thalictrum dasycarpum* (Pa.)

Phoma sp., on *Aquilegia vulgaris* (Pa.)

Phomopsis trollii Fairm., on cultivated *Trollius* sp. (N. Y.)

Phyllosticta clematidis Ellis & Dearn., on *Clematis* sp. (Va.)

Phyllosticta anemonicola Sacc. & Syd., on *Anemone canadensis* (Ill., Mich., Wisc.), on *Anemone cylindrica* (Ill., Nebr., Wisc.)

Phyllosticta ellisiana Lambotte & Fautr., on *Anemone virginiana* (Vt.)

Phyllosticta trollii Trail, on *Trollius laxus* (Wyo.)

Phyllosticta xanthorhizae Ellis & L. W. Nutt., on *Xanthorhiza simplicissima* (N. C., W. Va.)

Rhabdospora clarkeana Sacc., on *Aquilegia canadensis* (N. Y.)
Septoria anemones Desm., on *Anemone canadensis* (Ill., Iowa), on *Anemone cylindrica* (Wisc.), on *Anemone quinquefolia* (Wisc.), on *Anemone virginiana* (Ill., Iowa, Miss., Mo., Vt., Wisc.)
Septoria aquilegiae Penz. & Sacc., on *Aquilegia canadensis* (Ind., Mich., N. Y. **, Ohio, Vt., Wisc.), on *Aquilegia vulgaris* (Mich., Ohio, Va., Wisc.)
Septoria clematidis Roberge & Desm. (= *Septoria jackmani* Ellis & of N. Y. reports), on *Clematis virginiana* **, on *Clematis* sp. (Wash., Wisc.)
Septoria coptidis Berk & Curtis, on *Coptis trifolia* (Mich., N. Y. **)
Septoria coptidis Berk. & Curtis var. *macrospora* Peck, on *Coptis* trifolia **
Septoria cylindrica Ellis & Everh., on *Anemone cylindrica* (Mont.), on *Anemone virginiana* (Va.)
Septoria delphinella Sacc., on *Consolida ambigua* (Ill.)
Septoria ficarioides Peck, on *Ranunculus cymbalaria* (Nebr.)
Septoria hepaticae Desm., on *Hepatica nobilis* (Mich., N. C.)
Septoria longispora Overh., on *Aquilegia canadensis* (Pa.)
Septoria polaris P. Karst., on *Ranunculus hispidus* var. *caricetorum* (Wisc.), on *Ranunculus rhomboideus* (Wisc.)
Septoria punicea J. J. Davis (= *Phleospora anemones* Ellis & Kellerm.), on *Anemone cylindrica* (Iowa, Nebr., N. Y. **), on *Anemone virginiana* (Mass., Mich., Wisc.)
Septoria thalictri Ellis & Everh., on *Thalictrum dasycarpum* (conidial state of *Mycosphaerella thalictri*?)
Septoria sp., on *Ranunculus acris* (Pa.)
Sphaeropsis clematidis Dearn. & House (= *Otthia clematidis* Earle?), see *Physalospora obtusa* (Schw.) Cooke in the *Pleosporales*
Sphaeropsis thalictri Ellis & Fairm., on *Thalictrum* sp. (N. Y.)

MELANCONIALES

Colletotrichum dematium (Pers. ex Fries) Grove, on *Coptis trifolia* (Mass.)
Colletotrichum hepaticae Peck, on *Hepatica nobilis* var. *acuta* **
Cylindrosporium clematidis Ellis & Everh., on *Clematis virginiana* (Ala., Conn., Del., Ind., Mich., Miss., N. Y. **, Wisc.)
Cylindrosporium ficariae Berk., on *Ranunculus* sp. (Wash.)
Cylindrosporium montenegrinum Bubák, on *Trollius laxus* (Wyo.)
Cylindrosporium thalictri Ellis & Everh.) J. J. Davis, on *Thalictrum dasycarpum* (Ind., Kans., Wisc.), on *Thalictrum dioicum* (Wisc.)
Cylindrosporium sp., on *Caltha palustris* (N. Y.)
Gloeosporium thalictri J. J. Davis, on *Thalictrum dasycarpum* (Wisc.)
Gloeosporium sp., on cultivated *Helleborus* sp. (N. J.)
Vermicularia coptina Peck, on *Coptis trifolia* (N. Y. **)

MYCELIA STERILIA

Rhizoctonia solani Kühn, on cultivated *Aconitum* sp. (Conn., N. J.), on *Aquilegia vulgaris* (Ill.), on *Hydrastis canadensis* (N. C.)
Sclerotium delphinii Welch (? = *Sclerotium rolfsii* Sacc.), on cultivated *Aconitum* sp. (Conn., Del., Md., Minn., N. J., N. Y.), on *Consolida ambigua* (Mo., Tex.), on cultivated *Helleborus* sp. N.Y. ?)
Sclerotium rolfsii Sacc., on *Consolida ambigua* (Tex.)

APPENDIX II

A List of Some Insects Associated with Plant Species in this Treatment.

THYSANOPTERA

Thripidae
Frankliniella tritici (Fitch), on *Ranunculus bulbosus*

HEMIPTERA

Miridae
Halticus intermedius Uhler, on *Clematis virginiana*
Poecilocapsus lineatus Fabricus, Four-lined Plant Bug on *Aconitum* sp.

HOMOPTERA

Membracidae
Ceresa basalis Wlk., on *Clematis* sp.
Aphidae
Aphis craccivora Koch, on *Thalictrum revolutum*
Aphis rociadae Cockerell, on *Delphinium* (*Consolida*?)
Kakimia essigi Gillette & Palmer, on *Aquilegia vulgaris*
Kakimia purpurascens (Oestlund), on *Thalictrum pubescens*, on *Thalictrum revolutum*
Macrosiphon sp., on *Ranunculus repens*
Myzus persicae (Sulzer), on *Ranunculus* sp.
Pergandeidia trirhoda (Walker), on *Aquilegia vulgaris*
Thecabius populiconduplifolius ? (Cowen), on *Ranunculus repens*

COLEOPTERA

Meloidae
Epicauta pennsylvanica DeG., Black Blister Beetle, on *Clematis* sp.
Scarabeidae
Popillia japonica Newn., Japanese Beetle, on *Delphinium* (*Consolida*?), on *Thalictrum pubescens*
Cerambycidae
Brachysomida bivittata (Say), on flowers of *Anemone* sp.
Evodinus monticola monticola (Randall), on flowers of *Thalictrum* sp.
Gaurotes cynipennis (Say), on flowers of *Thalictrum* sp.
Grammoptera subargentata (Kirby), on flowers of *Ranunculus* sp. and *Thalictrum* sp.
Pygoleptura nigrella nigrella (Say), on flowers of *Thalictrum* sp.
Strangalepta vittata (Swederus), on flowers of *Ranunculus* sp.
Thigonarthris proxima (Say), on flowers of *Thalictrum* sp.

LEPIDOPTERA

Opostegidae
Opostega quadristrigella (Chambers), on ranunculaceous plants
Oecophoridae
Ethmia fuscipedelia Walsingham, on *Thalictrum* sp.
Aegeriidae
Alcathoe caudata Harris, on *Clematis* sp.
Thyrididae
Thyris maculata Harris, on *Clematis* sp.

Papilionidae
Papilio cresphontes Cramer, Giant Swallowtail, on *Thalictrum* sp.
Lycaenidae
Lycaenopsis pseudargiolus (Boisduval & Le Conte), on *Cimicifuga racemosa*
Hesperiidae
Erynnis lucilius (Scudder & Burgess), Columbine Skipper, on *Aquilegia canadensis*
Noctuidae
Calpe canadensis Bethune, on *Thalictrum pubescens*
Feltia ducens Wlk., Dingy Cutworm, on *Delphinium* sp. (*Consolida*?)
Heliothis virescens (Fabricus), Tobacco Budworm, on *Aquilegia canadensis*
Papaipema cataphracta (Grote), Burdock Borer, on *Thalictrum* sp., on *Delphinium* (garden varieties)
Papaipema cerussata (Grote), on *Thalictrum* sp.
Papaipema frigida (Smith), on *Thalictrum pubescens*
Papaipema nebris (Guenee), Common Stalk Borer, on garden *Delphinium*
Papaipema purpurifascia (Grote & Robinson), Columbine Borer, on *Aquilegia canadensis*, on *Aquilegia* sp.
Pseudeva purpurigera (Walker), on *Thalictrum* sp.
Pyrrhia umbra (Hufnagel), on *Aquilegia* sp.
Geometridae
Ectropis crepuscularia (Schiffermuller), on *Aquilegia* sp.

DIPTERA

Cecidomyiidae
Dasyneura anemone Felt, in loose bud gall on *Anemone canadensis*
Dasyneura clematidis Felt, gall on *Clematis virginiana*
Neolasioptera clematidis Felt, gall in *Clematis virginiana* stem
Phytophaga socialis Felt, on *Thalictrum dioicum*
Phytophaga thalictri Felt, on *Thalictrum dioicum*
Asphondylia thalictri Felt, in distorted *Thalictrum* fruits
Contarina clematidis Felt, on *Clematis virginiana*
Prodiplosis floricola Felt, in enlarged *Clematis virginiana* flowers
Lestodiplosis clematiflorae Felt, in unopened flowers of *Clematis virginiana*
Agromyzidae
Phytomyza aquilegiae Hardy, The Columbine Leaf-miner, on *Aquilegia canadensis*, *Aquilegia vulgaris*, and other garden Columbines
Phytomyza nitida Mel., on *Thalictrum* sp.
Phytomyza plumiseta Frost., on *Thalictrum* sp.

HYMENOPTERA

Colletidae
Colletes inaequalis Say, on *Anemone virginiana*
Hylaeus affinis (Smith), on *Clematis* sp.
Andrenidae
Andrena alleghaniensis Viereck, on *Ranunculus* sp.
Andrena carlini carlini Cockerell, on *Anemonella, Hepatica,* and *Isopyrum biternatum*
Andrena crataegi Robertson, on *Ranunculus* sp.
Andrena cressonii cressonii Robertson, on *Anemonella thalictroides*, and *Ranunculus* sp.
Andrena erigeniae Robertson, on *Isopyrum biternatum*
Andrena erythrogaster (Ashmead), on *Anemone canadensis*
Andrena erythronii Robertson, on *Hepatica nobilis*
Andrena forbesii Robertson, on *Ranunculus abortivus*
Andrena hippotes Robertson, on *Caltha palustris, Ranunculus abortivus,* and *Trollius laxus*
Andrena krigiana Robertson, on *Ranunculus acris*
Andrena mandibularis Robertson, on *Hepatica nobilis*

Andrena melanochroa Cockerell, on *Ranunculus* sp.
Andrena miranda Smith, on *Ranunculus hispidus* var. *caricetorum*
Andrena miserabilis Cresson, on *Hepatica nobilis, Isopyrum biternatum,* and *Ranuculus* sp.
Andrena morrisonella Viereck, on *Ranunculus acris*
Andrena nasonii Robertson, on *Ranunculus* sp.
Andrena nigrae Robertson, on *Anemone canadensis*
Andrena nigrihirta (Ashmead), on *Ranunculus* sp.
Andrena personata Robertson, on *Ranunculus abortivus* and *Ranunculus hispidus* var. *caricetorum*
Andrena rugosa Robertson, on *Isopyrum biternatum* and *Hepatica nobilis*
Andrena tridens Robertson, on *Hepatica nobilis*

Halictidae

Augochlora persimilis (Viereck), on *Ranunculus* sp.
Augochlora pura pura (Say), on *Ranunculus* sp.
Augochlorella striata (Provancher), on *Anemone* sp., on *Anemonella thalictroides,* on *Aquilegia* sp., on *Isopyrum biternatum,* on *Nigella damascena,* and on *Ranunculus* sp.

Megachilidae

Osmia conjuncta (Cresson), on *Anemonella thalictroides* and on *Ranunculus* sp.
Osmia georgica Cresson, on *Ranunculus* sp.
Osmia lignaria lignaria Say, on *Ranunculus* sp.
Osmia pumila Cresson, on *Anemonella thalictroides,* on *Isopyrum biternatum,* and on *Ranunculus* sp.
Osmia simillima Smith, on *Ranunculus* sp.
Megachile gemula gemula Cresson, on *Clematis* sp.
Megachile melanophaea melanophaea Smith, on *Ranunculus* sp.
Megachile mendica mendica Cresson, on *Clematis* sp.
Megachile relativa Cresson, on *Ranunculus* sp.

Anthophoridae

Melissodes agilis Cresson, on *Clematis* sp.
Synhalonia hamata (Bradley), on *Delphinium* sp. (*Consolida*?), and on *Ranunculus* sp.

Xylocopidae

Ceratinia calcarata Robertson, on *Caltha palustris,* on *Hepatica nobilis,* on *Isopyrum biternatum,* and on *Ranunculus* sp.
Ceratinia dupla Say, on *Anemonella thalictroides,* on *Delphinium* sp. (*Consolida*?), and on *Ranunculus* sp.
Xylocopa virginica virginica (Linnaeus), on *Aquilegia vulgaris*

Bombidae

Bombus vagans F. Smith, on *Aconitum noveboracense.*

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INDEX TO LATIN NAMES

Contributions Completed to Date[1]

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